

fiberdesk – graphical user interface

Modern GUI with access to parameter setup and field solution:

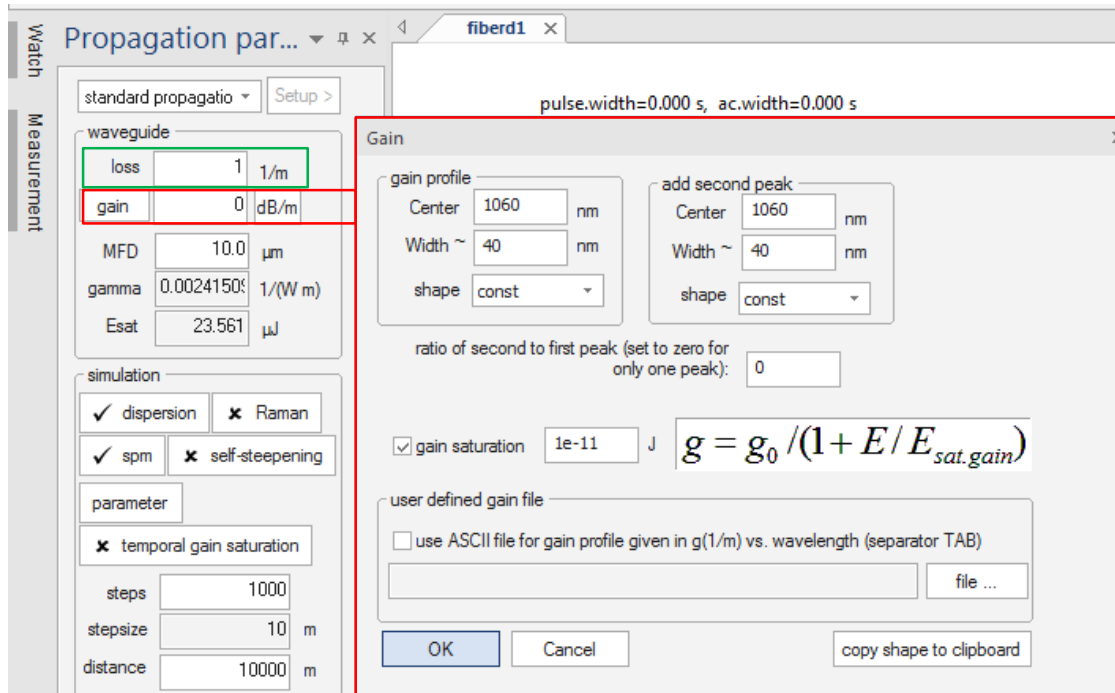
The screenshot displays the fiberdesk software interface with several key components highlighted by red boxes and arrows:

- Ribbon control:** Located at the top, it contains various tool icons for simulation and analysis, such as 'Start', 'parameter variation', 'PLOTTER', and 'Copy'. A red box labeled 'Ribbon control' points to this area.
- Propagation parameter:** A panel on the left side for configuring simulation settings like 'waveguide', 'loss', 'gain', and 'MFD'. A red box labeled 'Propagation parameter' points to this panel.
- Measured values:** A central table listing simulation results such as 'M5 - pulse avg. power', 'M6 - pulse rep. rate', and 'M9 - pulse RMS'. A red box labeled 'Measured values' points to this table.
- Main View:** The central workspace containing two plots: a 'Field' plot showing a pulse in the time domain (Time in ps) and a 'Spectrum' plot showing power spectral density (W ps⁻¹) versus Wavelength (μm). A red box labeled 'Main View' points to these plots.
- Measured graphs:** A table at the bottom left showing numerical data for various measurements. A red box labeled 'Measured graphs' points to this table.
- Output:** A window at the bottom right displaying the software's output log, starting with '1 Welcome to fiberdesk 6.0...'. A red box labeled 'Output' points to this window.

fiberdesk – NLSE parameter setup

Parameter access in detail:

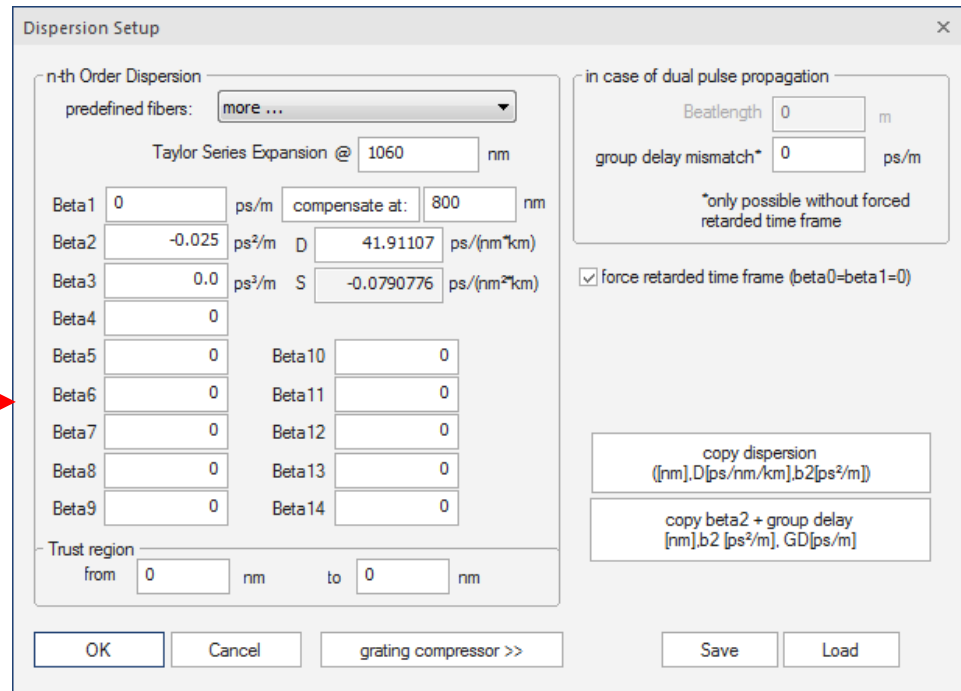
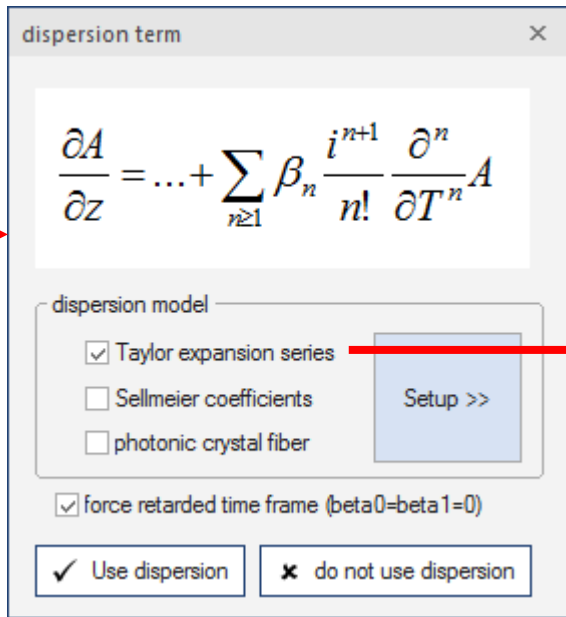
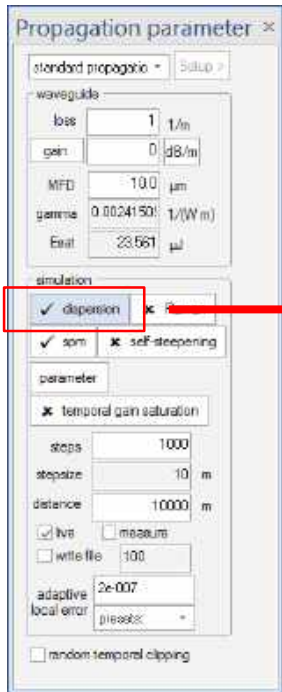
$$\frac{\partial A}{\partial z} = -\frac{\alpha}{2} A + \int_{-\infty}^{\infty} \frac{g(\omega)}{2} \tilde{A}(\omega) e^{-i\omega T} d\omega + \sum_{n \geq 1} \beta_n \frac{i^{n+1}}{n!} \frac{\partial^n}{\partial T^n} A + i\gamma \cdot \left(1 + i\tau_{shock} \frac{\partial}{\partial T} \right) \left(A(T) \int_{-\infty}^{\infty} R(\tau) |A(T-\tau)|^2 d\tau \right)$$



fiberdesk – NLSE parameter setup

Parameter access in detail:

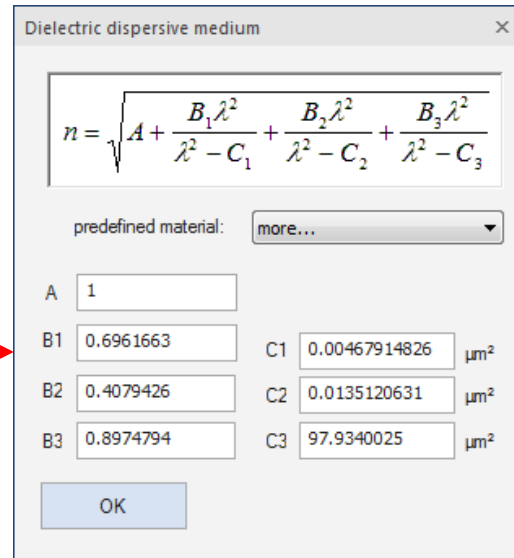
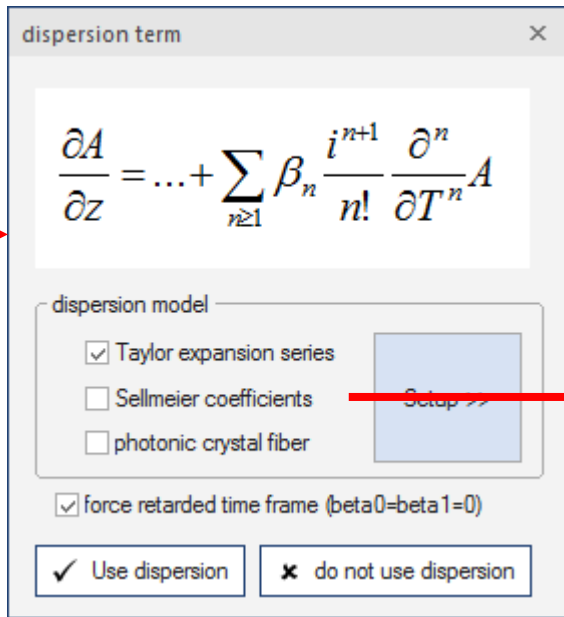
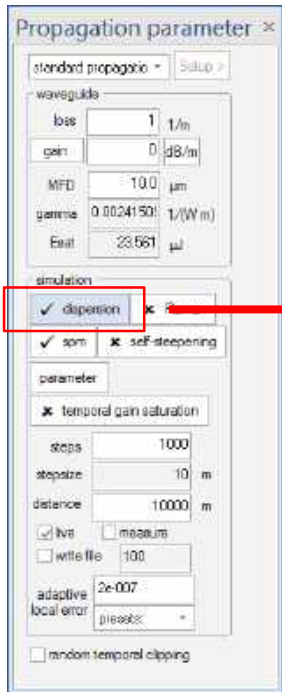
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fiberdesk – NLSE parameter setup

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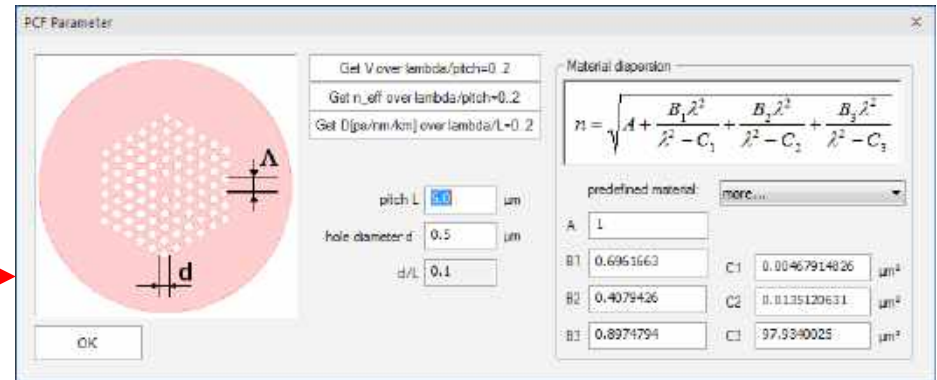
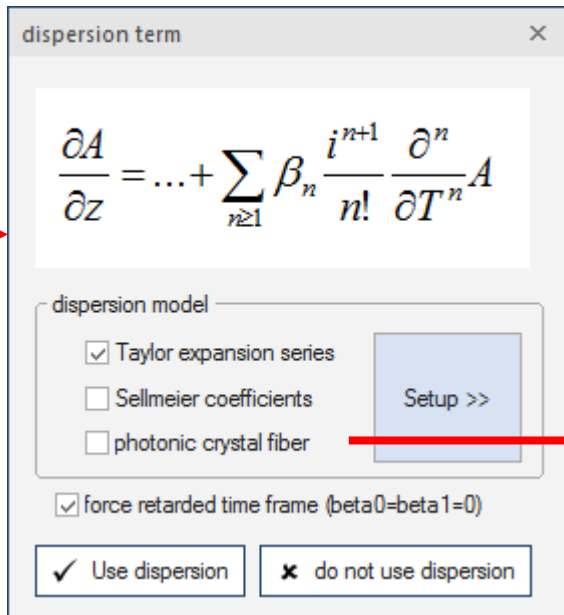
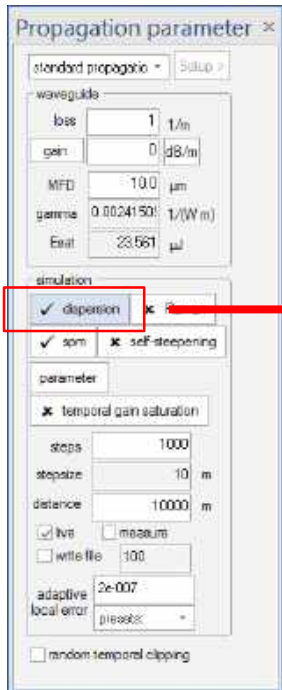
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fiberdesk – NLSE parameter setup

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fiberdesk – NLSE parameter setup

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self phase modulation term

$$\frac{\partial A}{\partial z} = \dots + i\gamma \cdot (1 - f_R) A(T) |A(T)|^2$$

$$\gamma = \frac{\omega_0}{c} \frac{n_2}{A_{eff}} \quad \text{and} \quad A_{eff} = \frac{\pi}{4} MFD^2$$

n2 m²/W f R

saturate SPM

saturation power density GW/cm²

use SPM exclude SPM

fiberdesk – NLSE parameter setup

Parameter access in detail:

$$\frac{\partial A}{\partial z} = -\frac{\alpha}{2}A + \int_{-\infty}^{\infty} \frac{g(\omega)}{2} \tilde{A}(\omega) e^{-i\omega T} d\omega + \sum_{n \geq 1} \beta_n \frac{i^{n+1}}{n!} \frac{\partial^n}{\partial T^n} A + i\gamma \cdot \left(1 + i\tau_{shock} \frac{\partial}{\partial T} \right) \left(A(T) \int_{-\infty}^{\infty} R(\tau) |A(T-\tau)|^2 d\tau \right)$$

Propagation parameter

standard propagation

waveguide

loss 1/m

gain dB/m

MFD μm

gamma 1/(W·m)

Emit μm

simulation

dispersion Raman

spm self-steepening

parameter

temporal gain saturation

steps

stepsize m

distance m

live measure

write file

adaptive

local error

random temporal clipping

term delayed Raman response

hR

t-t' (fs)

gR

f (THz)

$$\frac{\partial A}{\partial z} = \dots + i\gamma \cdot \left(1 + i\tau_{shock} \frac{\partial}{\partial T} \right) \left(A(T) \int_{-\infty}^{\infty} R(\tau) |A(T-\tau)|^2 d\tau \right)$$

$$R(t) = (1 - f_R) \delta(t) + f_R h_R(t)$$

f_R h_R(t) = StepT(t) * (VoigtT(t, 1.00, 1.69, 4.91, 1.63) + VoigtT(t, 11.40, 3.00, 10.41, 3.65) + VoigtT(t, 36.67, 5.94, 16.49, 5.50) + VoigtT(t, f

VoigtT(f, f_s intensity_position_THz, GaussFWHM_THz, LorentzianFWHM_THz)

StepT(t) - Heaviside step function

use term exclude term

convolute with current spectrum

multi tone fused silica

fiberdesk – NLSE parameter setup

Parameter access in detail:

$$\frac{\partial A}{\partial z} = -\frac{\alpha}{2} A + \int_{-\infty}^{\infty} \frac{g(\omega)}{2} \tilde{A}(\omega) e^{-i\omega T} d\omega + \sum_{n \geq 1} \beta_n \frac{i^{n+1}}{n!} \frac{\partial^n}{\partial T^n} A + i\gamma \cdot \left(1 + i\tau_{shock} \frac{\partial}{\partial T} \right) \left(A(T) \int_{-\infty}^{\infty} R(\tau) |A(T-\tau)|^2 d\tau \right)$$

Propagation parameter

standard propagation - Setup

waveguide

loss 1 1/m

gain 0 dB/m

MFD 10.0 μm

gamma 0.0024150 1/(Wm)

Ernl 23.561 μm

simulation

dispersion Raman

sgn self-steepening

parameter

temporal gain saturation

steps 10000

stepsize 10 m

distance 10000 m

live measure

write file 100

adaptive local error 2e-007

preselect -

random temporal clipping

term self steepening

$$\frac{\partial A}{\partial z} = \dots + i\gamma \cdot \left(1 + i\tau_{shock} \frac{\partial}{\partial T} \right) \left(A(T) \int_{-\infty}^{\infty} R(\tau) |A(T-\tau)|^2 d\tau \right)$$

$$\tau_{shock} \cong \tau_0 + \tau_A = \frac{1}{\omega_0} - \left[\frac{1}{n_{eff}} \frac{dn_{eff}(\omega)}{d\omega} \right]_{\omega_0} - \left[\frac{1}{A_{eff}} \frac{dA_{eff}(\omega)}{d\omega} \right]_{\omega_0}$$

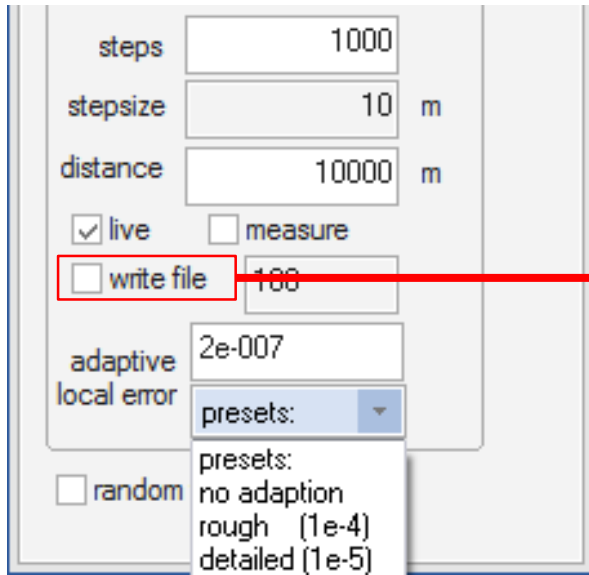
additional shock time tau_A 0.0 fs

use self steepening term exclude self steepening

fiberdesk – NLSE parameter setup

Propagation setup: distance, stepsize, numerical accuracy etc.

$$\frac{\partial A}{\partial z} = -\frac{\alpha}{2}A + \int_{-\infty}^{\infty} \frac{g(\omega)}{2} \tilde{A}(\omega) e^{-i\omega T} d\omega + \sum_{n \geq 1} \beta_n \frac{i^{n+1}}{n!} \frac{\partial^n}{\partial T^n} A + i\gamma \cdot \left(1 + i\tau_{shock} \frac{\partial}{\partial T} \right) \left(A(T) \int_{-\infty}^{\infty} R(\tau) |A(T-\tau)|^2 d\tau \right)$$



file contains the initial field plus 100 fields from the calculated propagation for later analysis

file extension: *.BPF

lecture 1

Three simple steps:

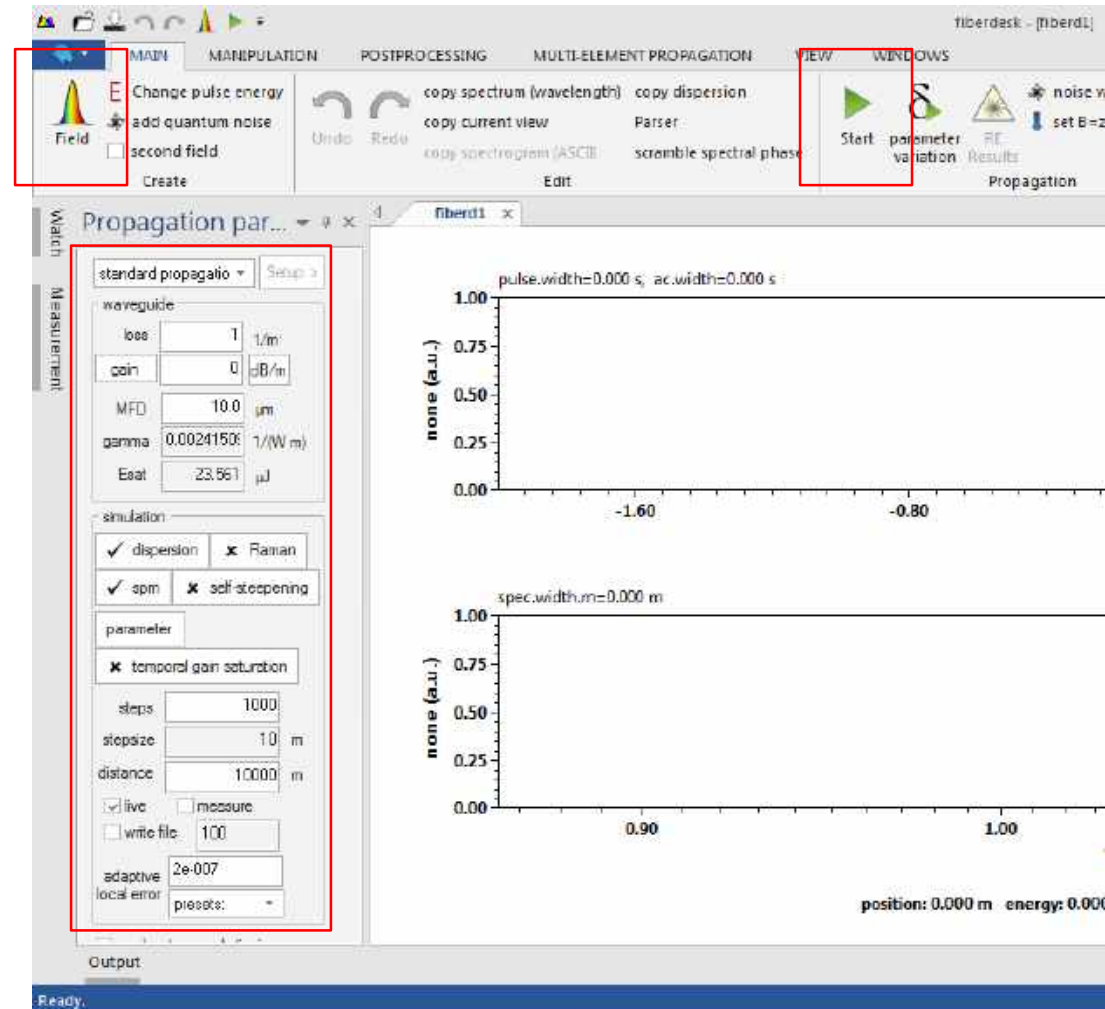
- (1) create a pulse
- (2) choose parameters
- (3) press start



lecture 1

Three simple steps:

- (1) create a pulse
- (2) choose parameters
- (3) press start



lecture 2

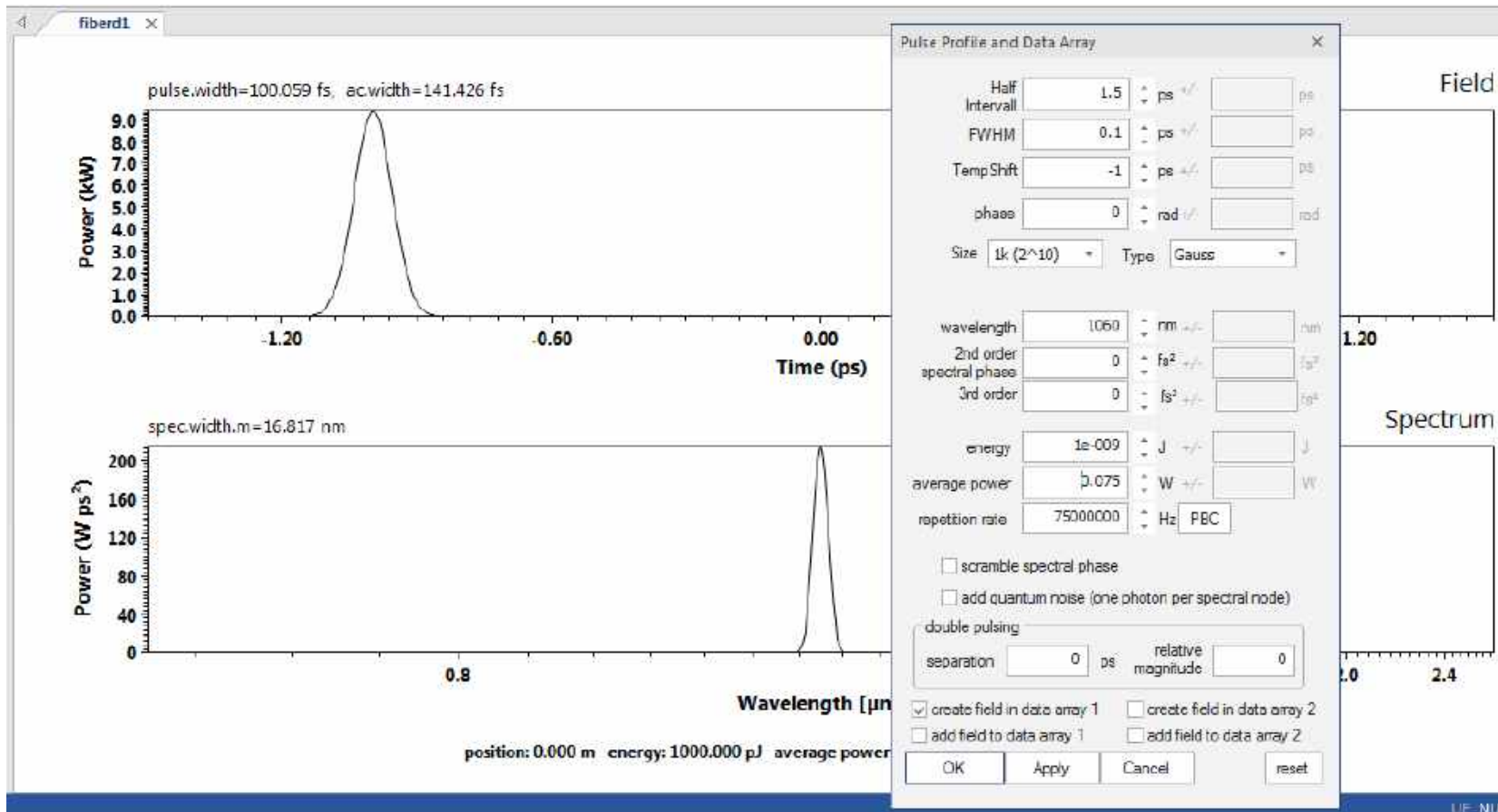
supercontinuum generation, numerical error control and measurements

- (1) create a pulse
- (2) choose parameters
- (3) press start
- (4) put result to memory
- (5) repeat with higher accuracy
- (6) check measurements
- (7) noise and coherence



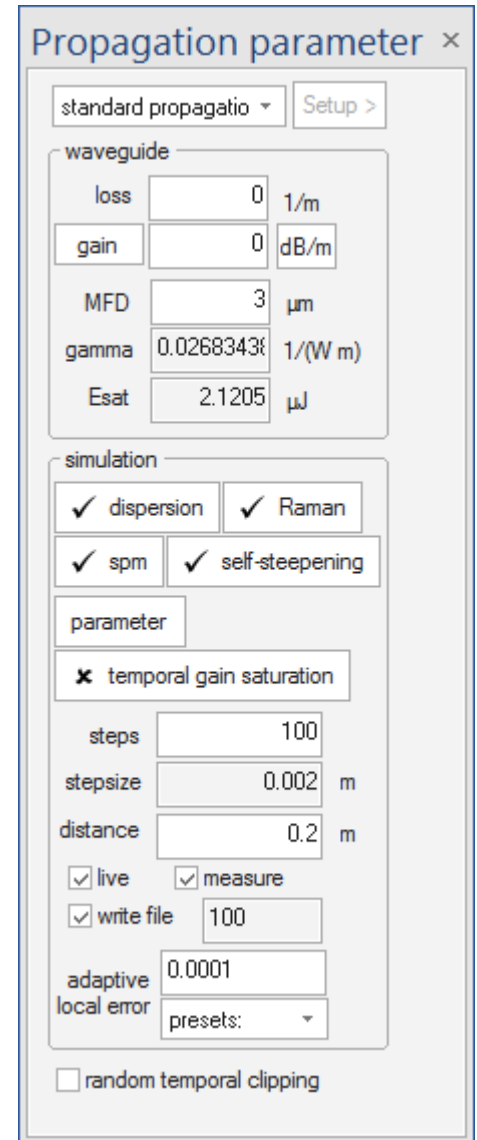
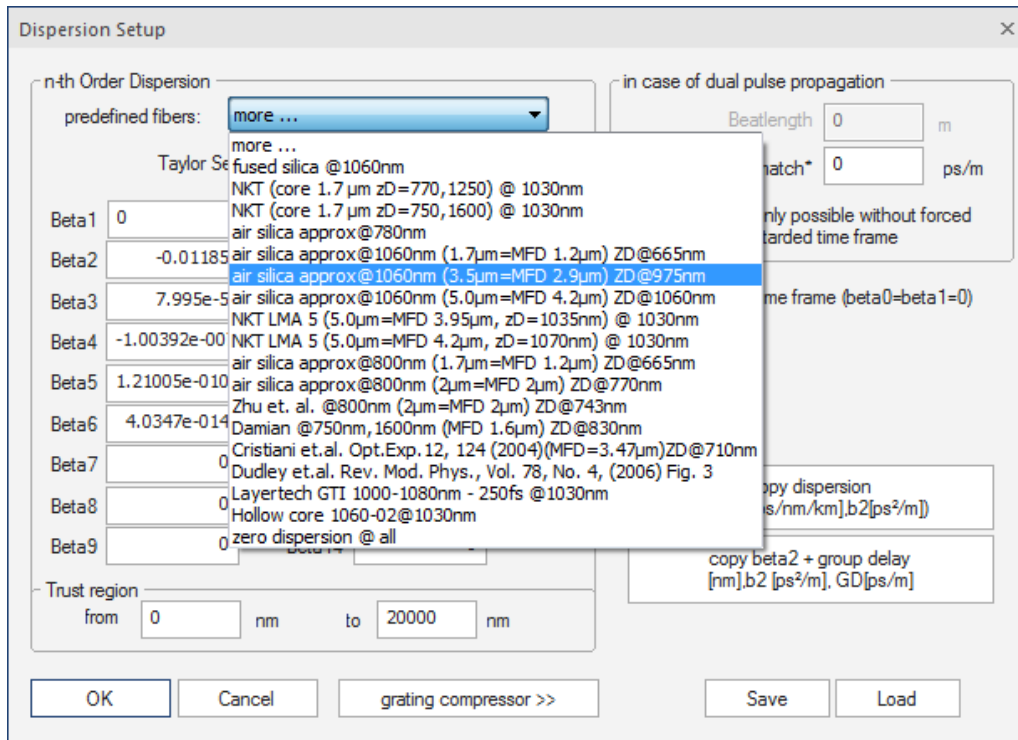
lecture 2

100 fs pulse, temporal windows +/-1.5 ps, 1k datapoints, temporal shift: -1 ps, energy 1 nJ, central wavelength 1060 nm

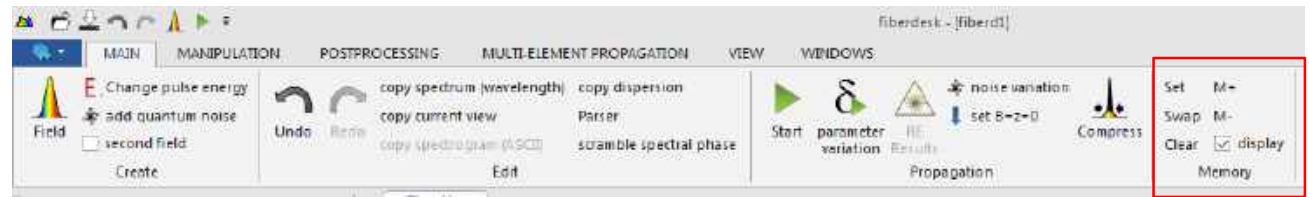


lecture 2

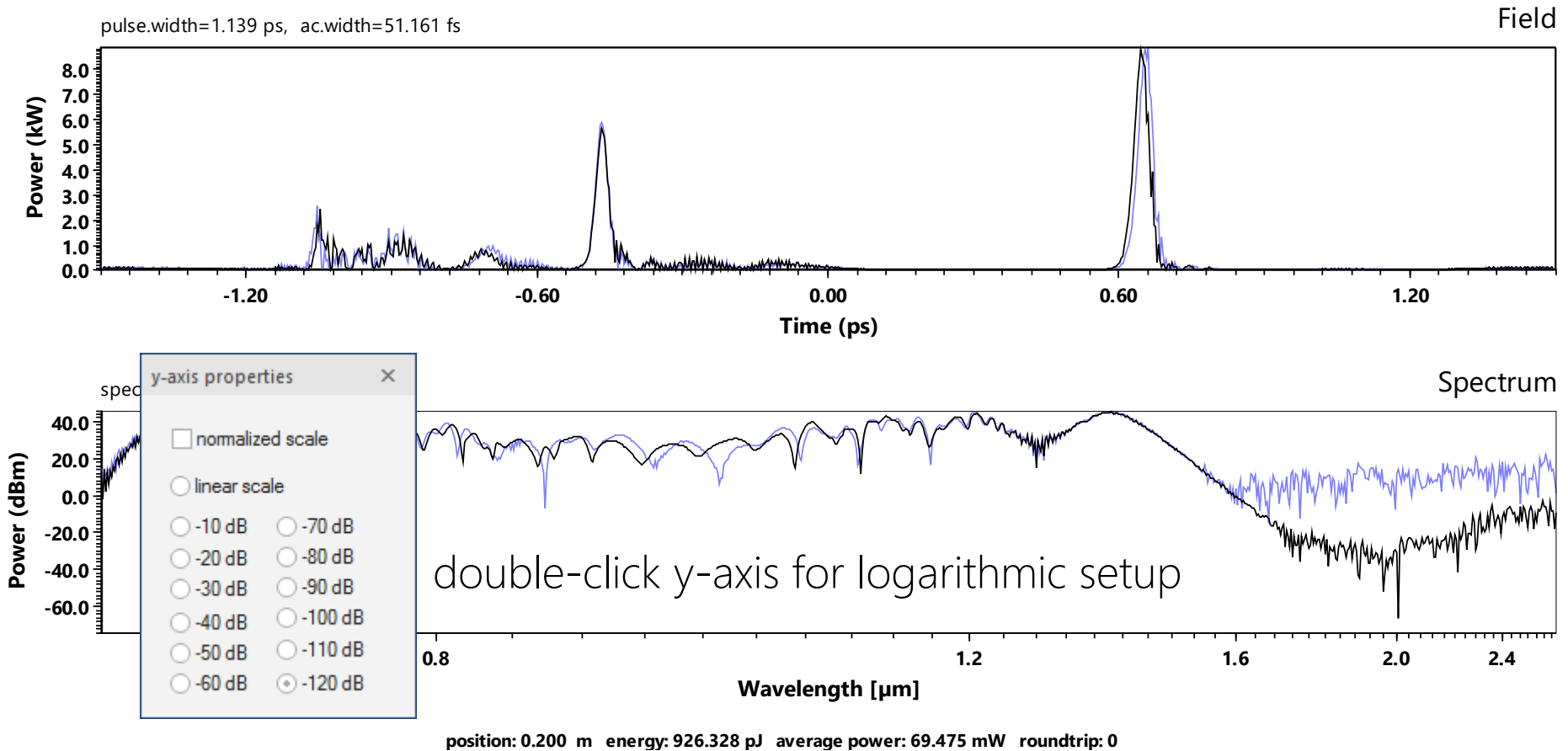
fiber is: NKT-ZD-975 with 2.9 μm MFD, all nonlinear effects considered, Raman response function is simple Lorentz, dispersion preselected.



lecture 2

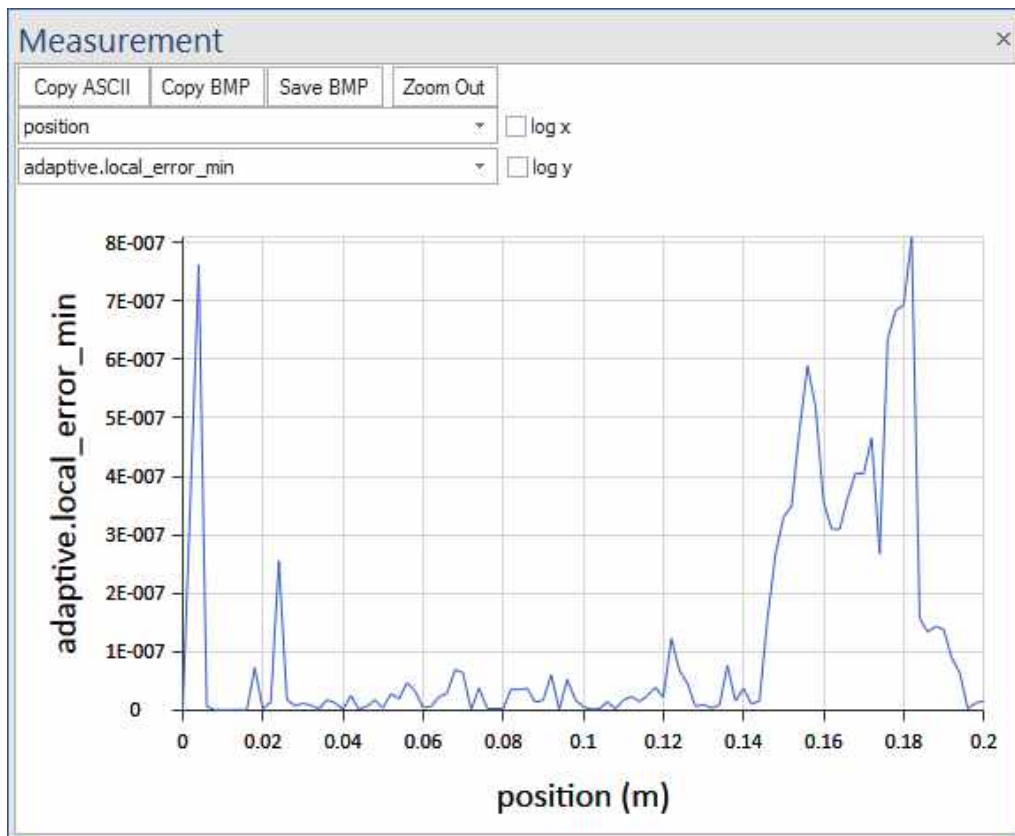


propagate 0.2 m, 100 steps, different accuracy results saved via „memory“ > „set“



lecture 2

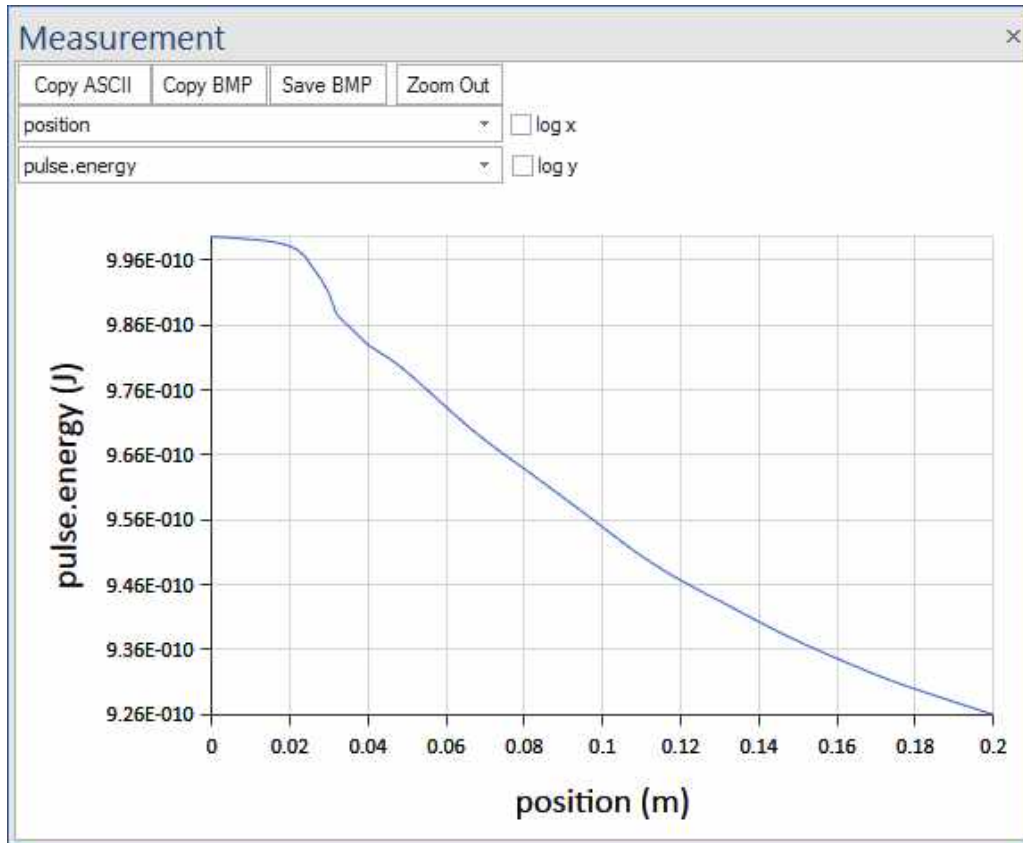
adaptive algorithm is bounded by local error
as we measured everything, it can be analysed in the measurement graph



Example: supercontinuum generation with local error $< 1e-6$

lecture 2

Measurements allow for more detailed analysis:

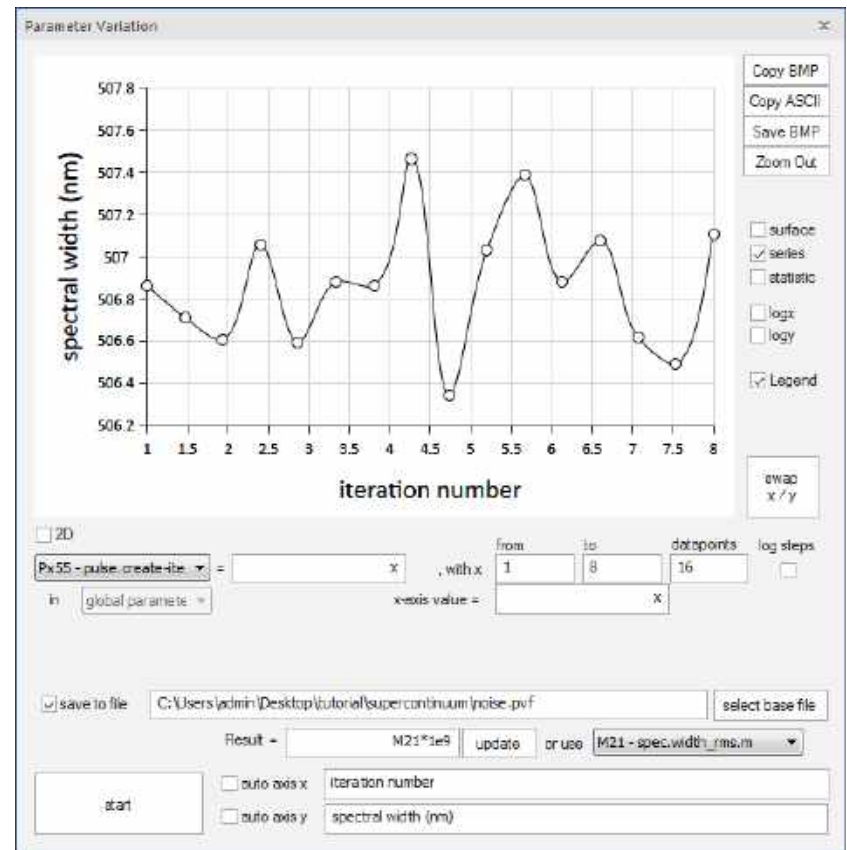
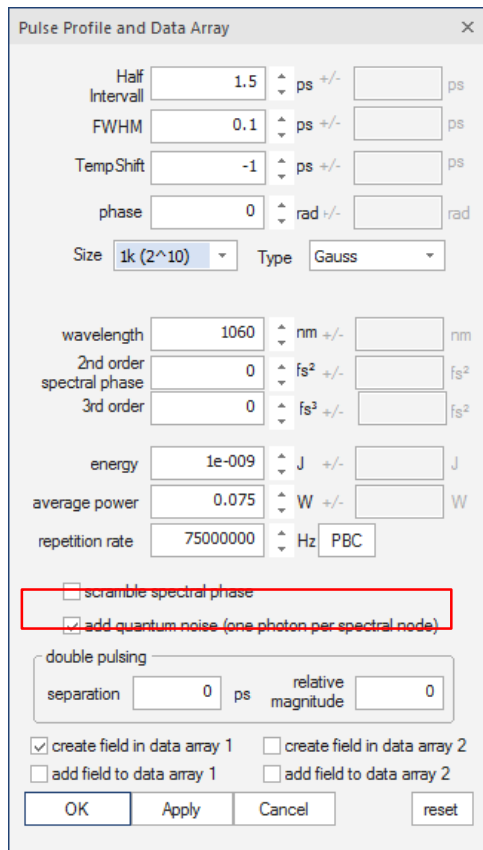


Example: supercontinuum generation energy drop due to intrapulse Raman shift of the soliton, once it is „created“

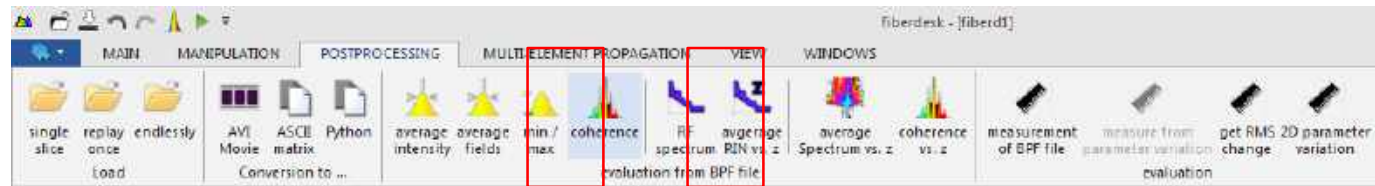
lecture 2



noise and coherence: same starting pulse as before but with quantum noise added, use „propagation“ > “parameter variation“ dialog with iterating pulse creation



lecture 2

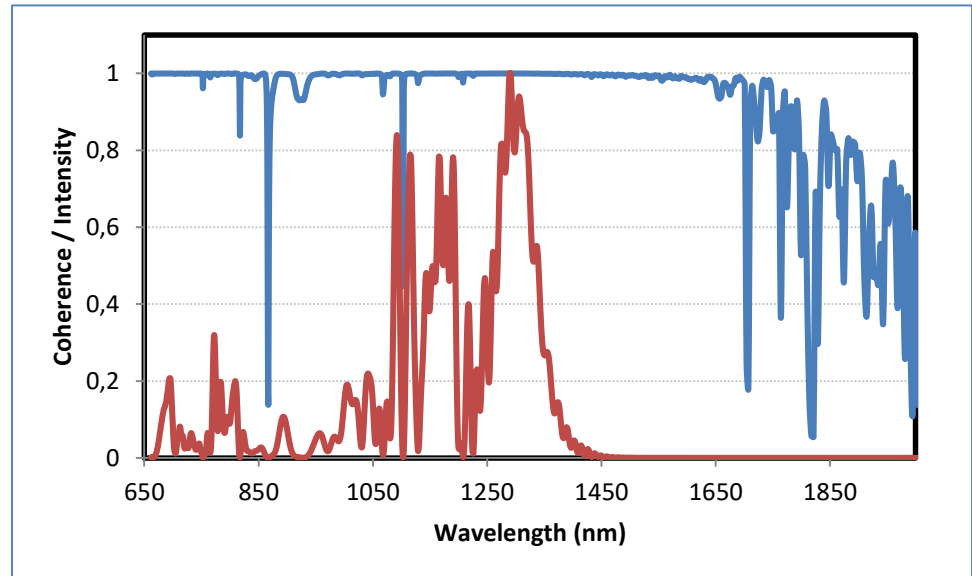


the saved file is now used for average spectrum and coherence calculation via
Postprocessing > coherence

Postprocessing > average intensity

paste both results to clipboard and display in e.g. MS Excel

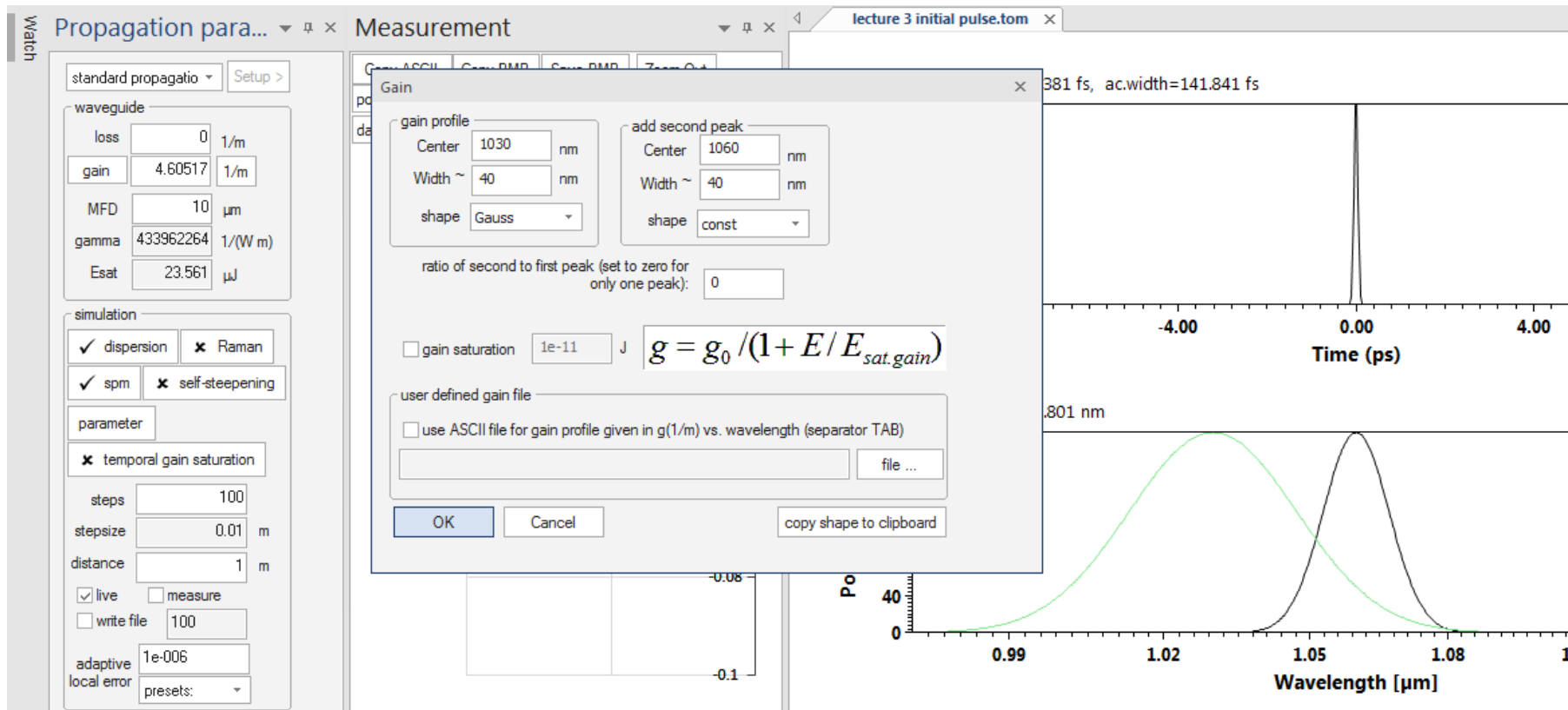
$$|g_{12}(\lambda)| = \frac{\left| \langle E_1^*(\lambda) E_2(\lambda) \rangle \right|}{\sqrt{\langle |E_1(\lambda)|^2 \rangle \langle |E_2(\lambda)|^2 \rangle}}$$



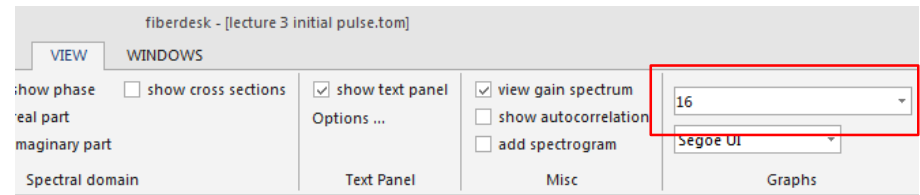
lecture 3

100 fs pulse, +/-10ps window, 1k, 1nJ

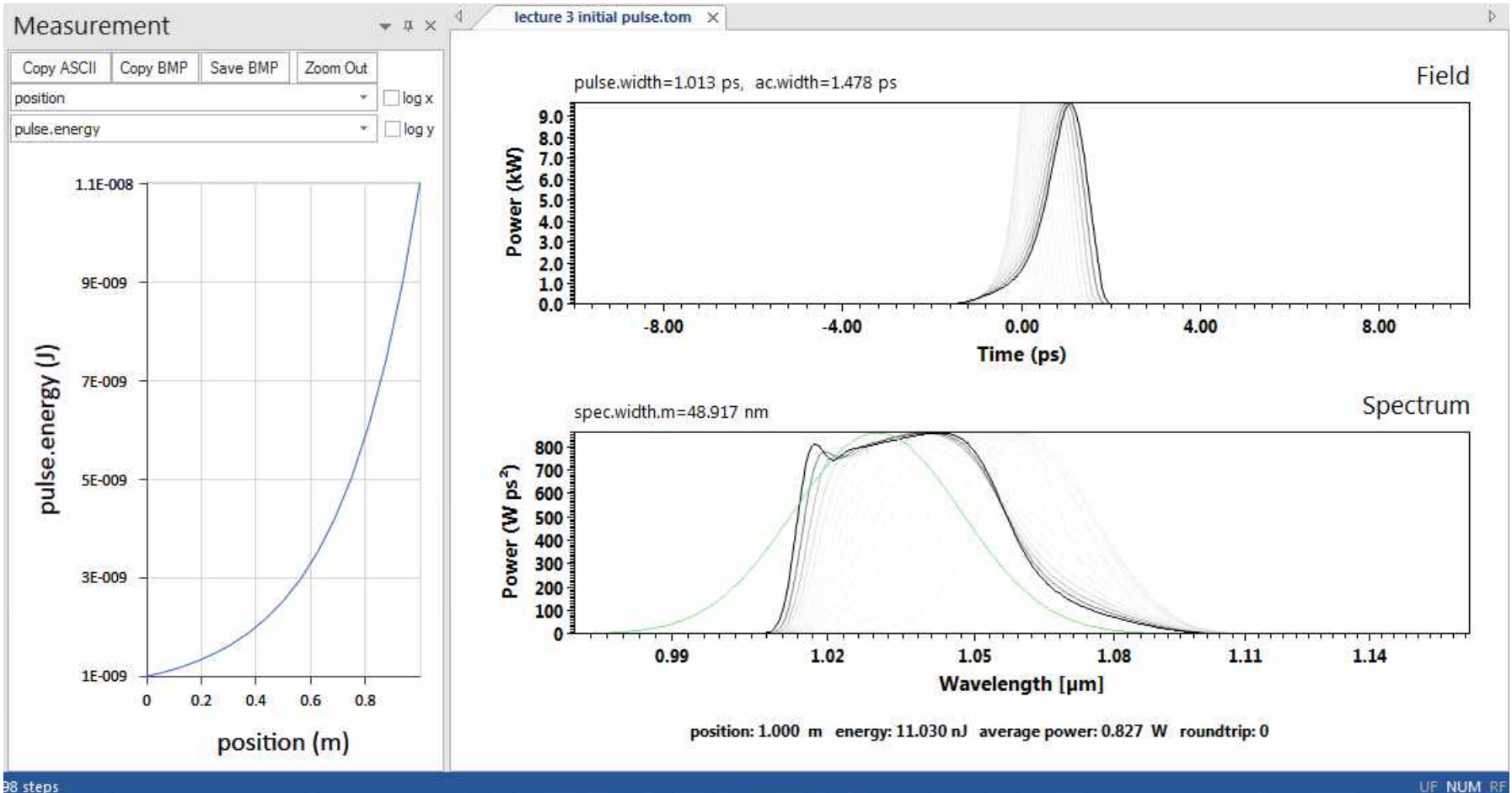
only dispersion and spm, MFD=10 μm, L=1 m, gain=20dB/m, profile: 1030 nm, 40 nm width, gaussian



lecture 3



results – with „view“ > “persistence” set to 16 and 16 steps.



lecture 4

pulse compression

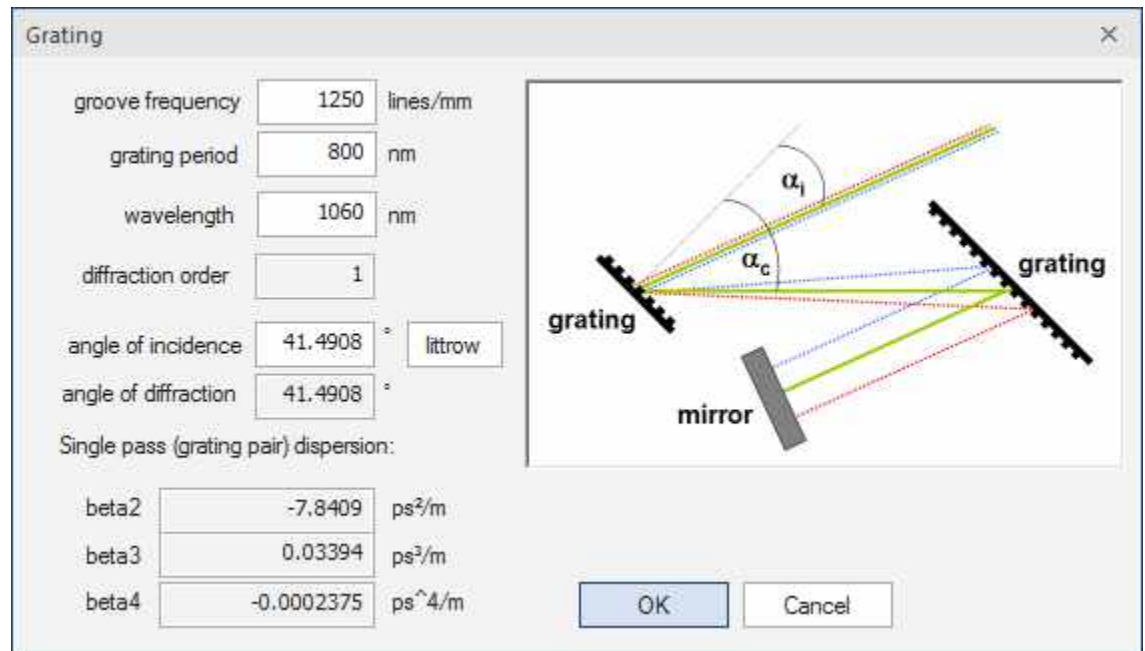
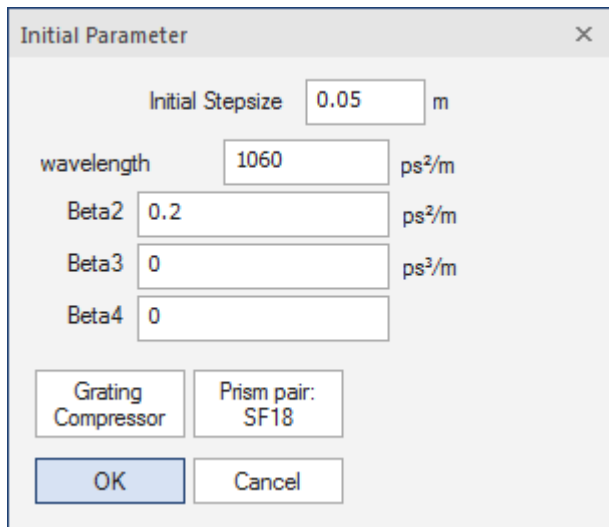


lecture 4



pulse compression

automatic compression minimizes autocorrelation width

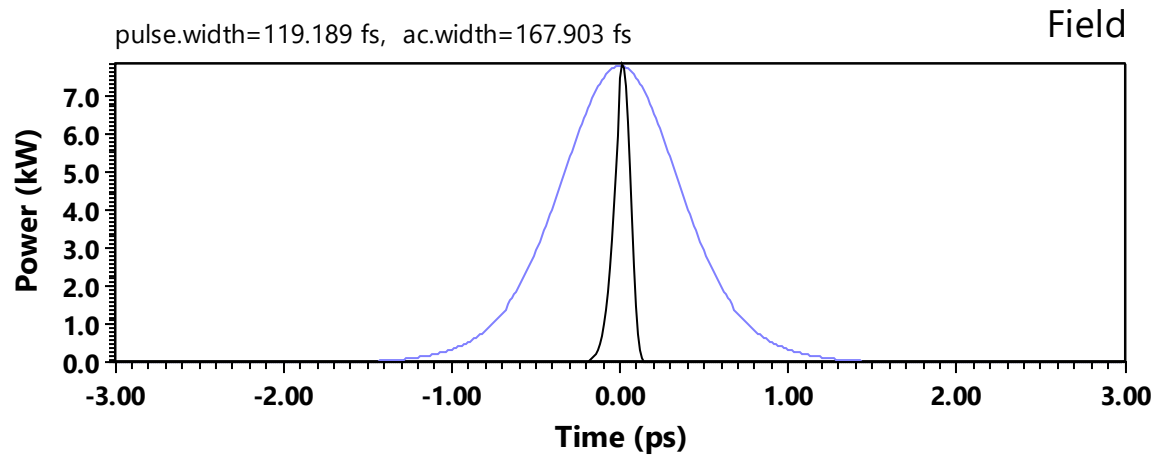
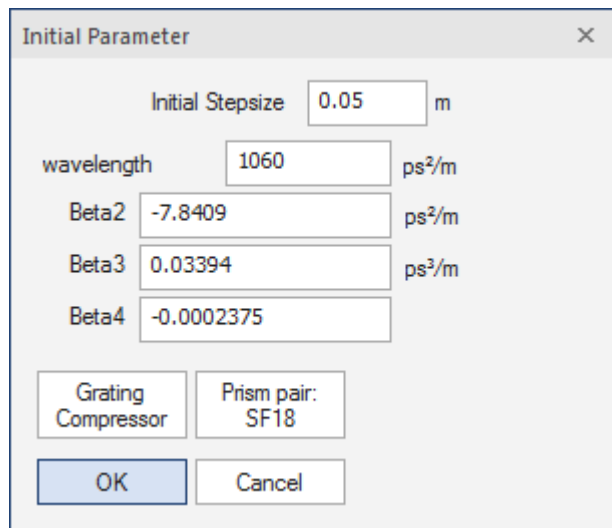


lecture 4

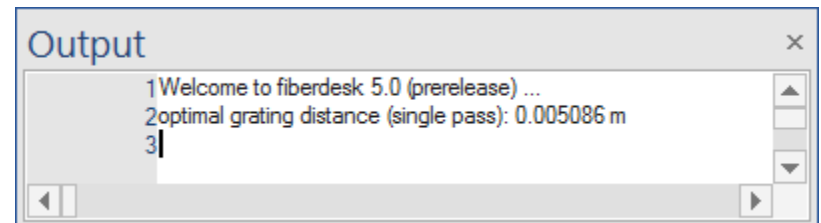


pulse compression

automatic compression minimizes autocorrelation width



Optimized distance out via „output“ window

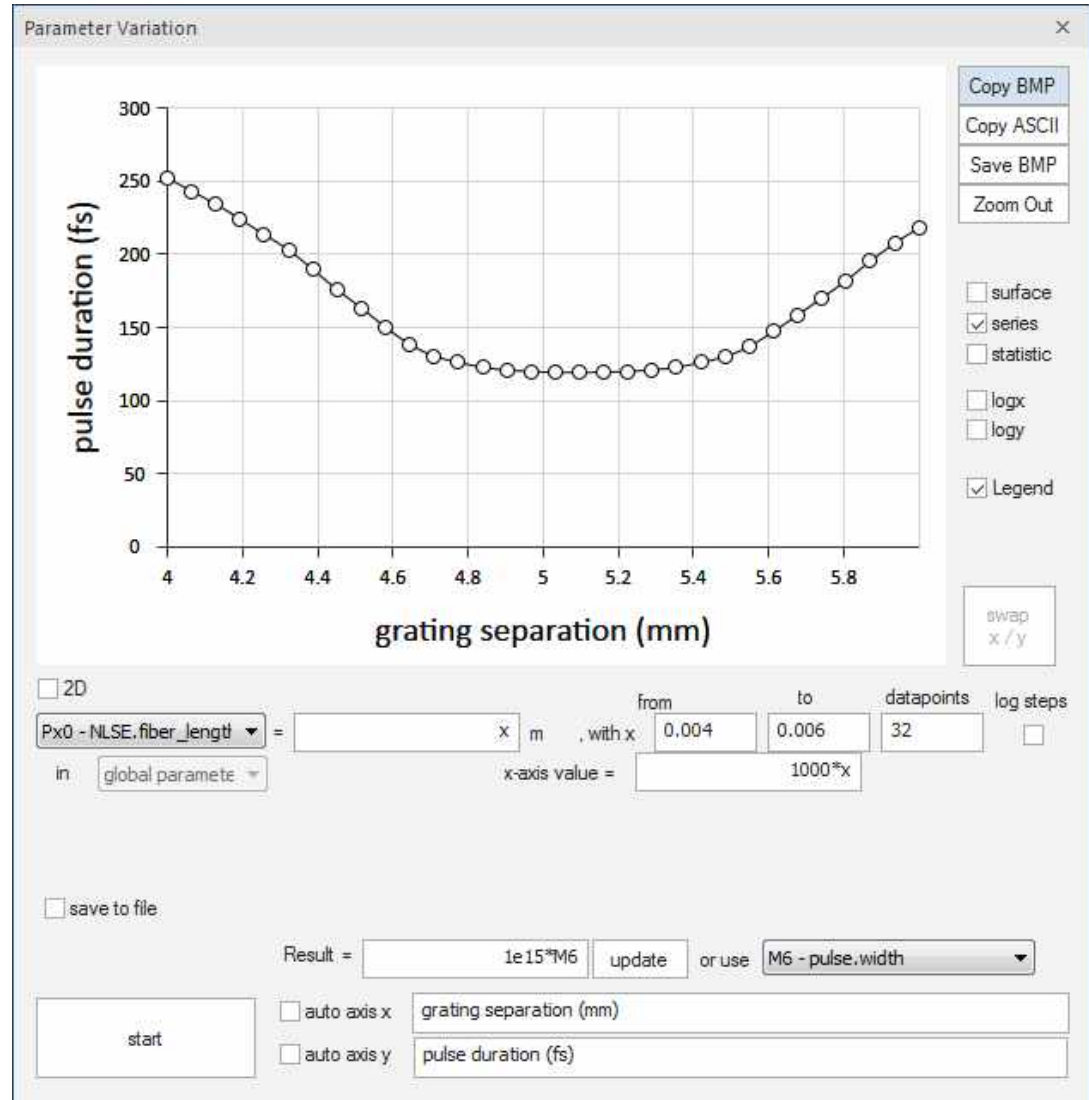


lecture 4



pulse compression

Or via parameter variation (e.g. length by setting up a dispersive element)



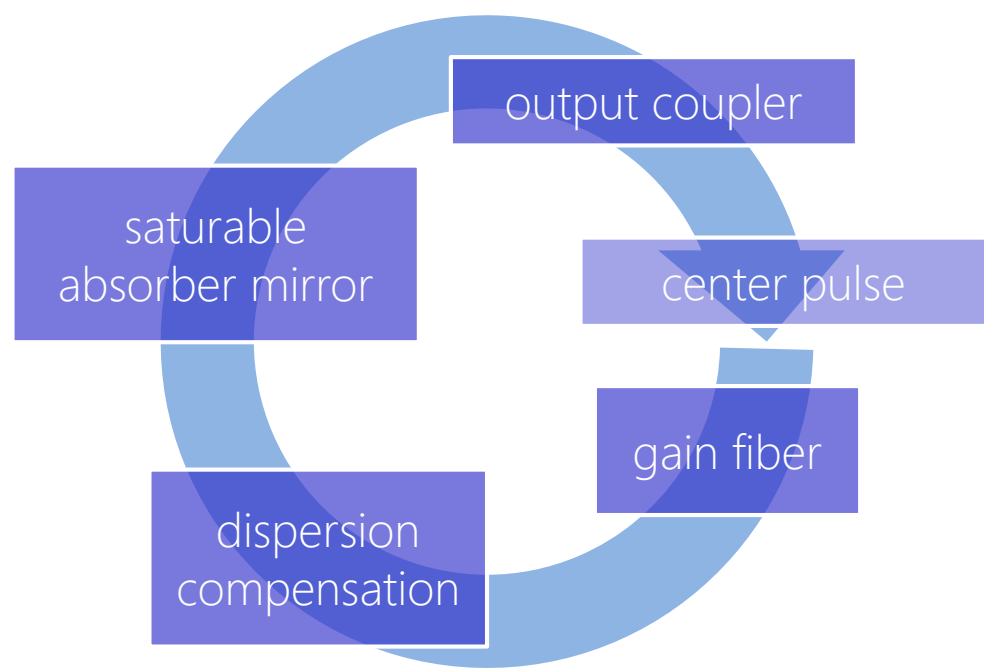
lecture 5

Multi-Element Propagation



lecture 5

Multi-Element Propagation: Example: Short Pulse Fiber Lasers



- fiber laser cavity:

ring cavity

Fast saturable absorber modelled by reflectivity R

$$R = R_{unsat} + R_{sat} \cdot \left(1 - \frac{1}{1 + P/P_{sat}} \right)$$

- modelling of each part by the NLSE

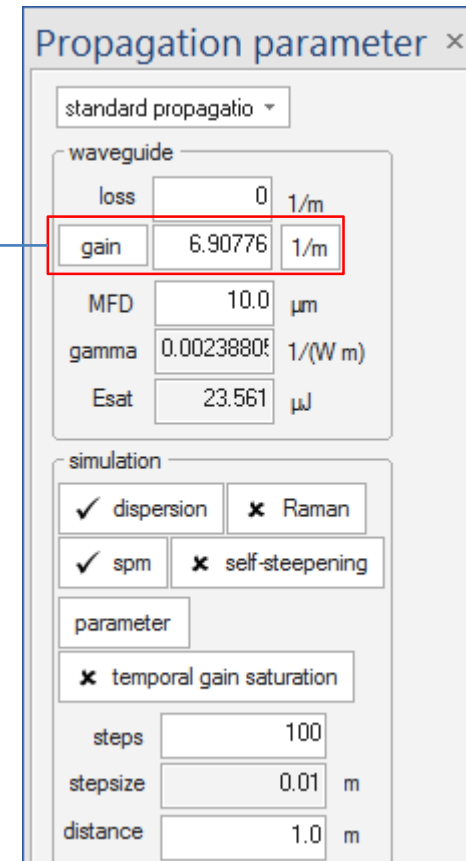
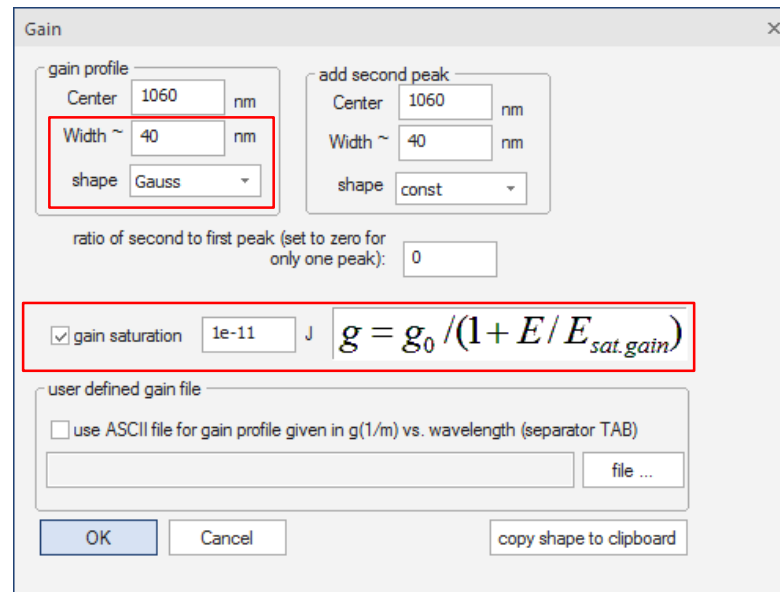
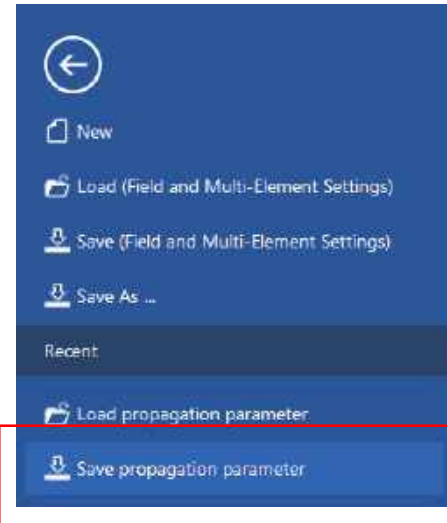
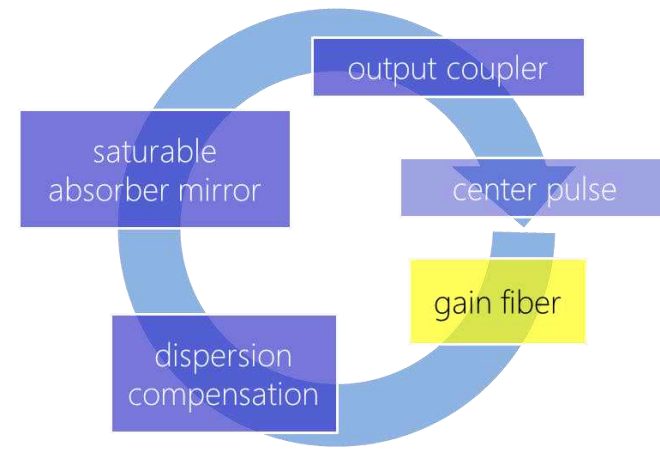
$$iA_z + \frac{g}{2} A + i\beta_2 A_{tt} = i\gamma |A|^2 A$$

lecture 5

Multi-Element Propagation: Example: Short Pulse Fiber Lasers

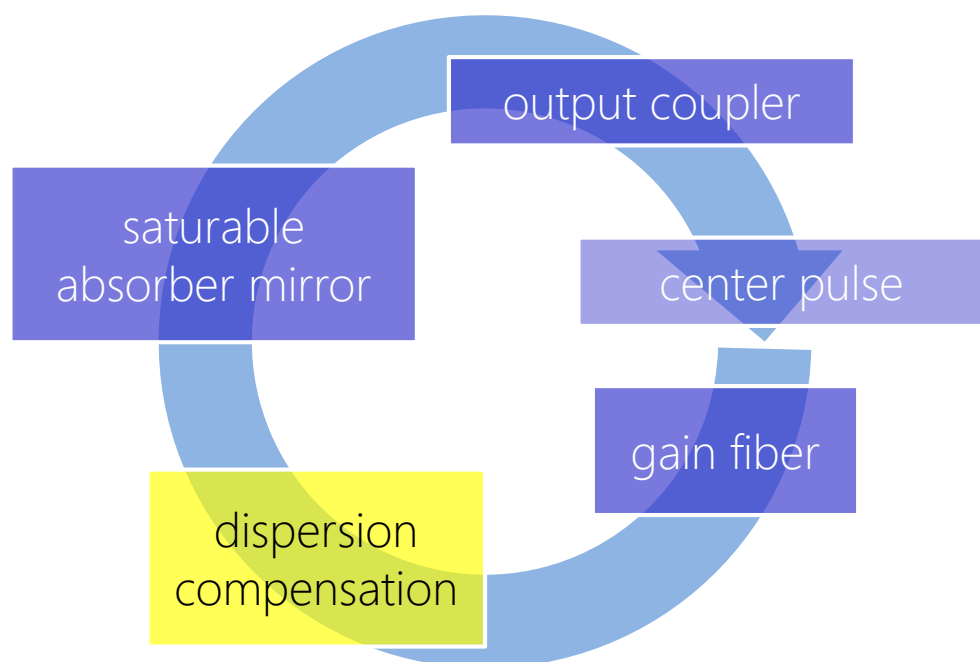
Set up the gain fiber as a standard propagation with saturable gain

save as fiber.ppf



lecture 5

Multi-Element Propagation: Example: Short Pulse Fiber Lasers



Dispersion Setup

n-th Order Dispersion

predefined fibers: more ...

Taylor Series Expansion @ 1060 nm

Beta1	0	ps/m	compensate at:	800	nm
Beta2	-0.02	ps ² /m	D	33.52886	ps/(nm ² km)
Beta3	0.0	ps ³ /m	S	-0.0632621	ps/(nm ³ km)
Beta4	0				
Beta5	0		Beta10	0	
Beta6	0		Beta11	0	
Beta7	0		Beta12	0	
Beta8	0		Beta13	0	
Beta9	0		Beta14	0	

Trust region from 0 nm to 0 nm

OK Cancel grating compressor >>

dispersion term

$$\frac{\partial A}{\partial z} = \dots + \sum_{n \geq 1} \beta_n \frac{i^{n+1}}{n!} \frac{\partial^n}{\partial T^n} A$$

dispersion model

- Taylor expansion series
- Sellmeier coefficients
- photonic crystal fiber

force retarded time frame (beta0=beta1=0)

Use dispersion do not use dispersion

simulation

- dispersion
- Raman
- spm
- self-steepening
- temporal gain saturation

parameter

steps 1

stepsize 1 m

distance 1.0 m

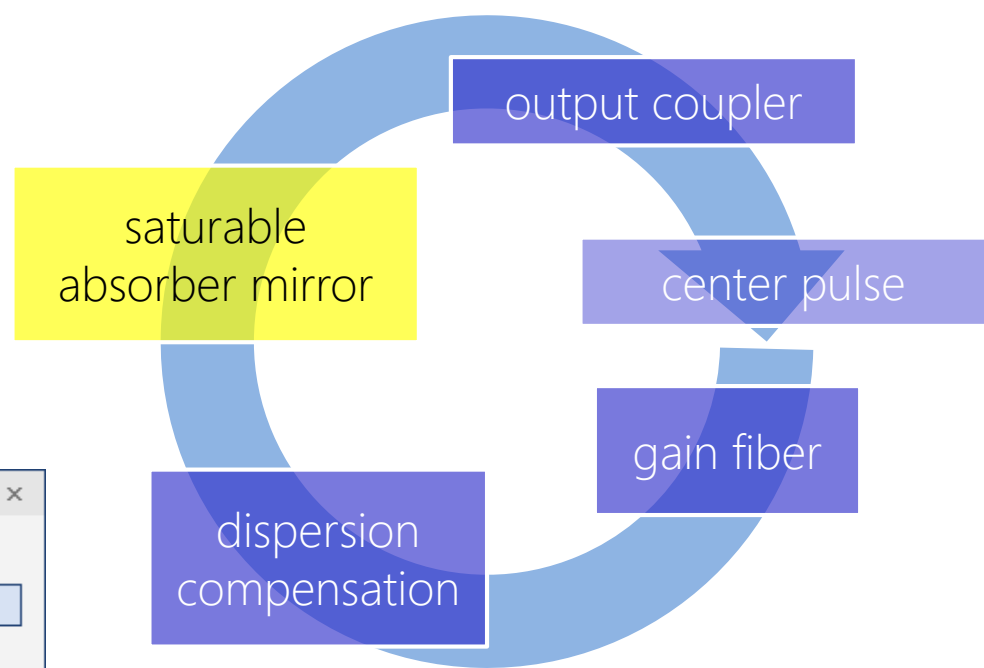
live measure

write file 100

save as dc.ppf

lecture 5

Multi-Element Propagation: Example: Short Pulse Fiber Lasers



Saturable Loss

Fast saturable loss

R0 70 %

dR 30 %

PA 100 W

$$R = R_0 + \Delta R - \frac{\Delta R}{1 + \frac{|A(T)|^2}{P_A}}$$

OK

Cancel

saturable absorber mirror with time constants

unsaturated reflectivity 60 %

temporal response A 0.2 ps

saturable reflectivity 30 %

saturation fluence 80 $\mu\text{J}/\text{cm}^2$

focal spot diameter 10 μm

saturation energy 0.062831852 nJ

use $R=R_0+dR*\sin^2(\text{Pi}/2)*(P/\text{PA})+\text{phi}_0$

R0 70 dR 30 PA 1 phi_0 0

Propagation parameter

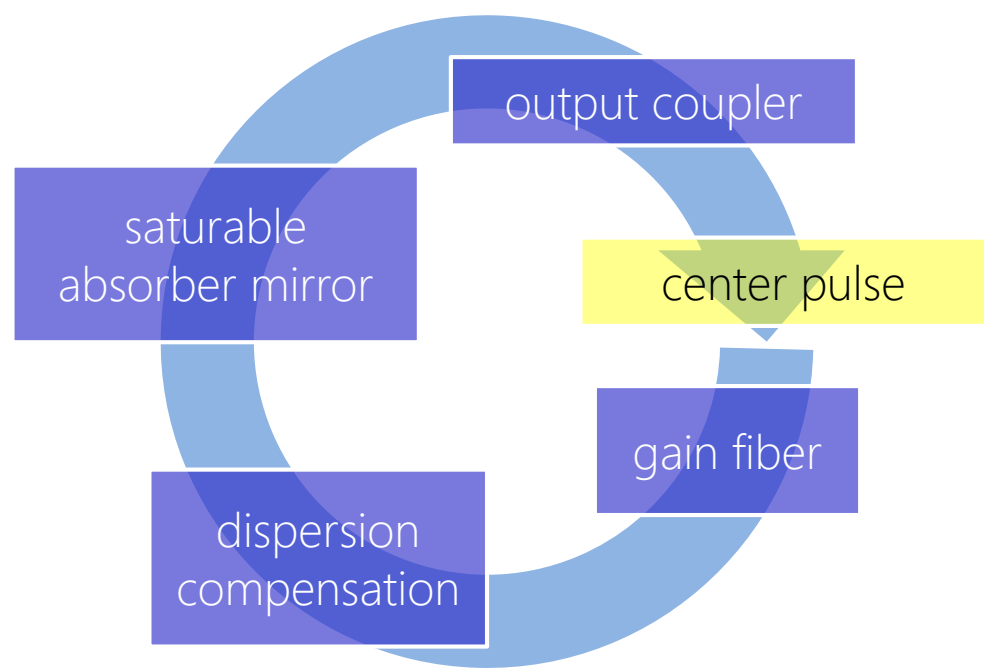
saturable absorber Setup >

waveguide

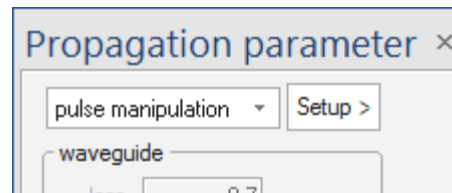
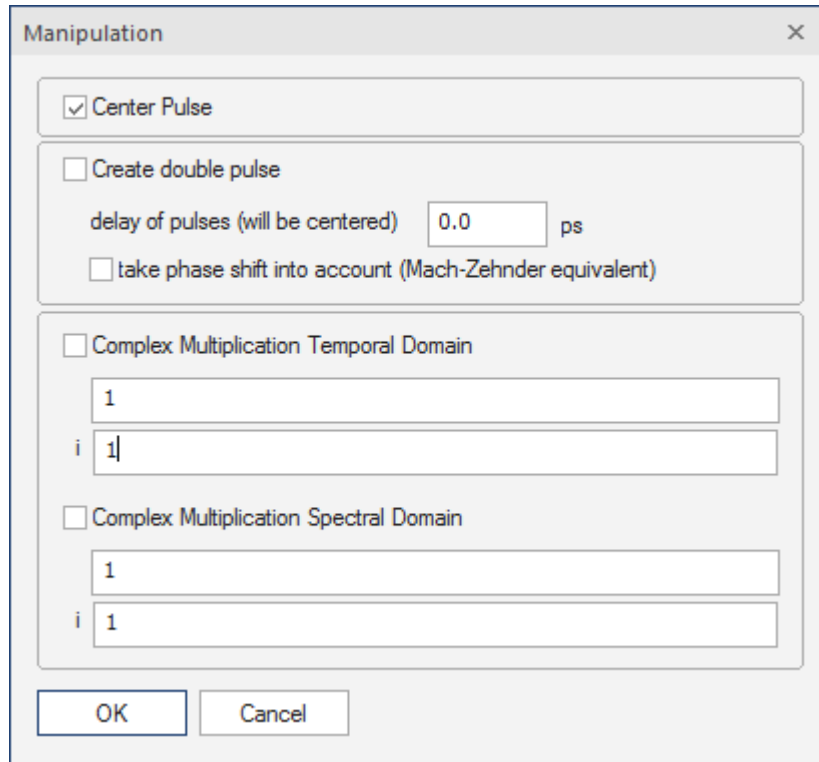
save as SA.ppf

lecture 5

Multi-Element Propagation: Example: Short Pulse Fiber Lasers



- Center pulse in the time domain, helps to converge the pulse, as change is measured in the time domain
- Can be combined with OC.ppf



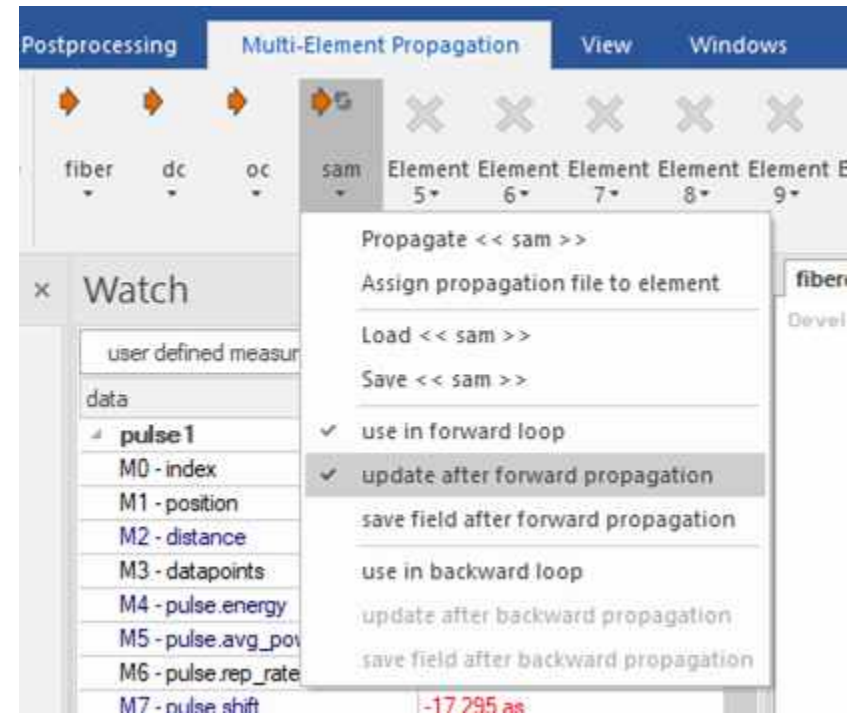
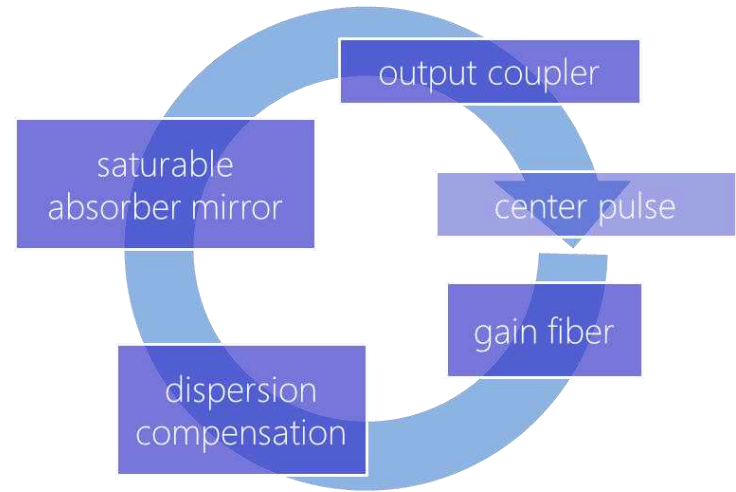
save as center.ppf

lecture 5

Multi-Element Propagation:

Example: Short Pulse Fiber Lasers

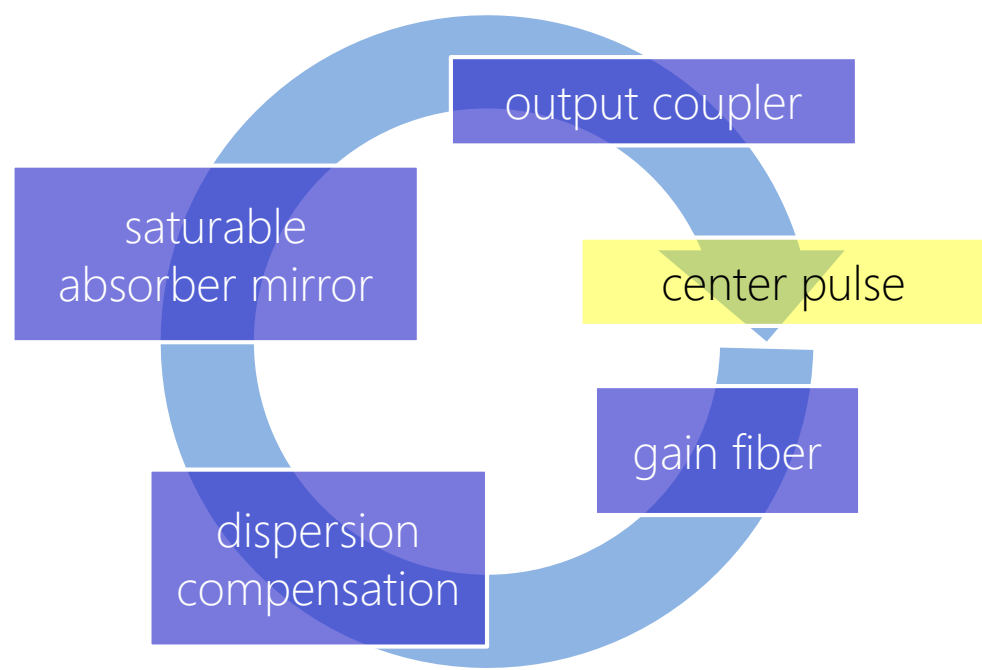
- assign all files to elements in the order of the cavity
- Select the last one to be updated after each loop to see convergence live
- Icons change according to selected status



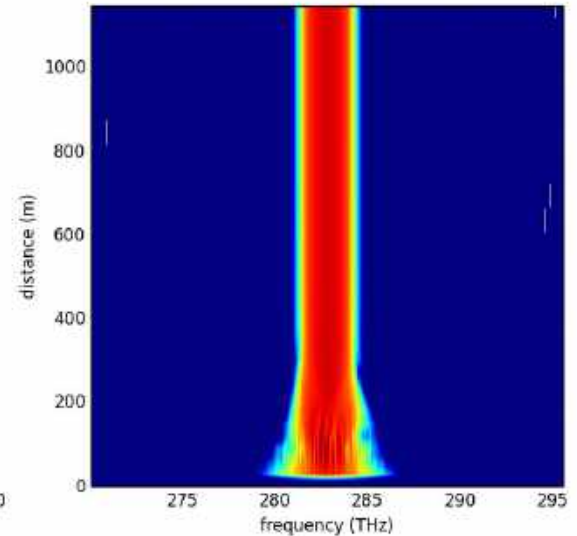
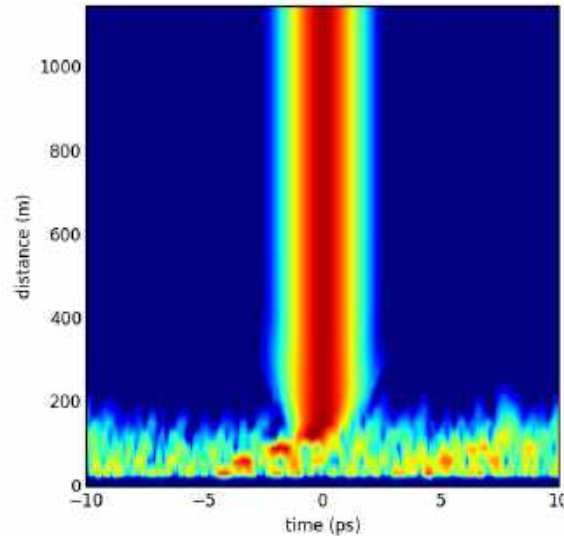
lecture 5

Multi-Element Propagation: Example: Short Pulse Fiber Lasers

Postprocessing > Python



```
Spyder (Python 2.7)
File Edit Search Source Run Debug Interpreters Tools View ?
C:\Users\admin\Desktop\lutra\fiberdesk-show.py
untitled5.py untitled7.py untitled8.py
220 dist = 800
221
222 data_spec/= data_spec.max()
223 spec=np.reshape(np.log10(data_spec),(frames,data_spec.shape
224 data_time/= data_time.max()
225 time=np.reshape(np.log10(data_time),(frames,data_time.shape
226
227 fig1 = plt.figure()
228 ax = fig1.add_subplot(121)
229 bx = fig1.add_subplot(122)
230
231 # range is the logarithmic dB range
232 r = 40
233 range = 40
234 r = range/10.0
235 levels=np.linspace(r,0.0,R)
236
237 # draw the field
238 x = np.linspace(t_min,t_max,data_time.shape[0]/frames)
239 y = np.linspace(0.0,dist,frames)
240 X, Y = np.meshgrid(x, y)
241 p1=ax.contourf(X,Y,time,levels,extend = 'both')
242 ax.set_xlabel('time (ps)')
243 ax.set_ylabel('distance (m)')
244
245 # draw the spectrum
246 x = np.linspace(s_min,s_max,data_spec.shape[0]/frames)
247 y = np.linspace(0.0,dist,frames)
248 X, Y = np.meshgrid(x, y)
249 p2=bx.contourf(X,Y,spec,levels,extend='both')
250
251 bx.set_xlabel('frequency (THz)')
252 bx.set_ylabel('distance (m)')
253
254 plt.show()
```

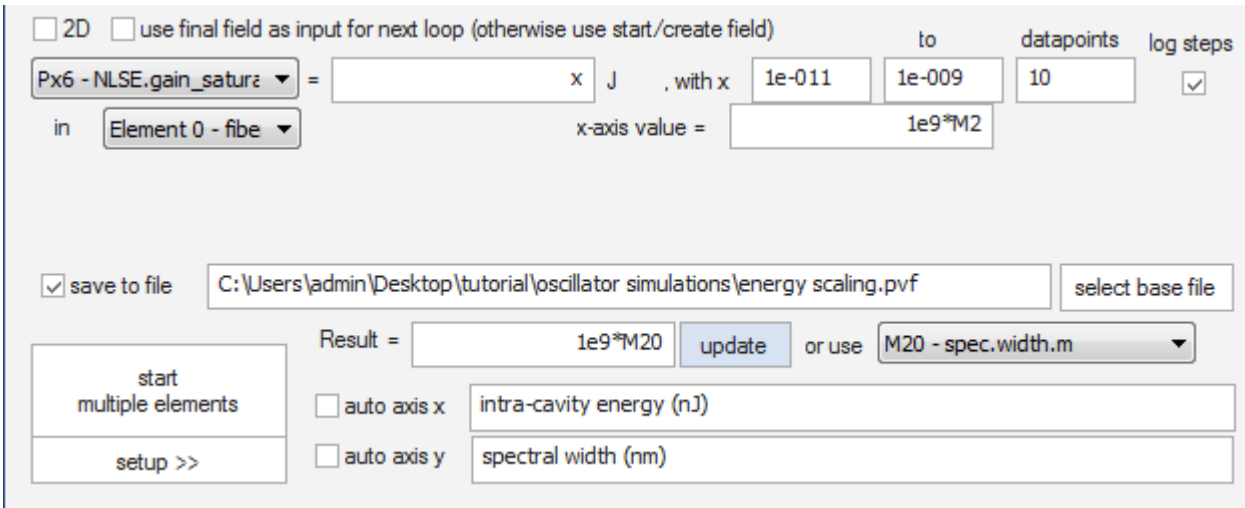
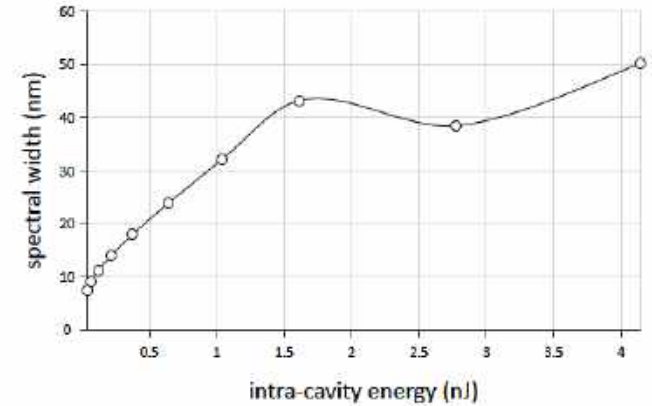
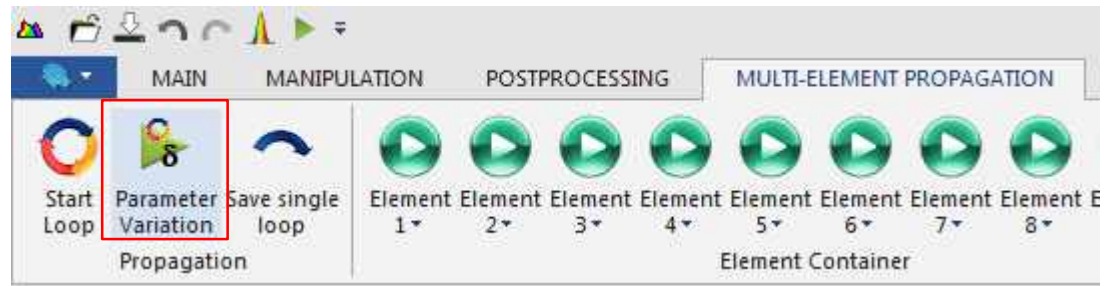


lecture 5

Multi-Element Propagation:

Example: Short Pulse Fiber Lasers

Multi-element > Parameter variation
 we change the gain saturation to
 increase the energy (remark: intracavity
 energy!)

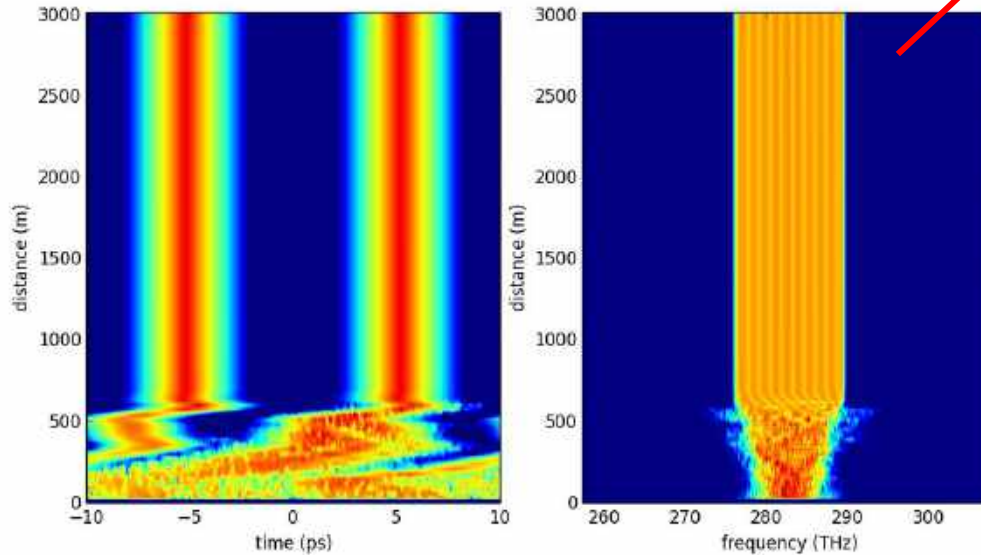
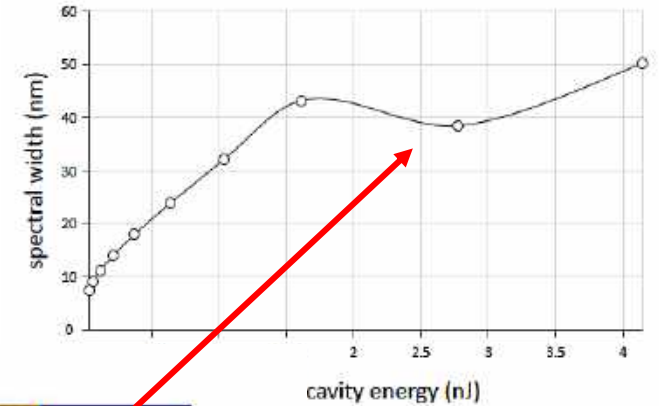
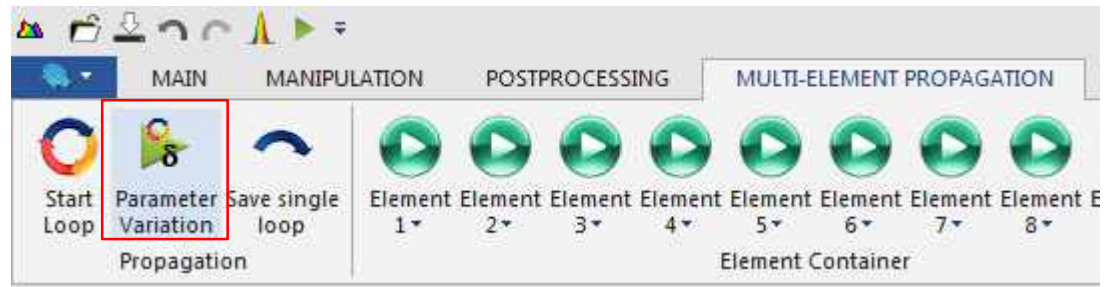


lecture 5

Multi-Element Propagation:

Example: Short Pulse Fiber Lasers

Multi-element > Parameter variation
we change the gain saturation to
increase the energy (remark: intracavity
energy!)

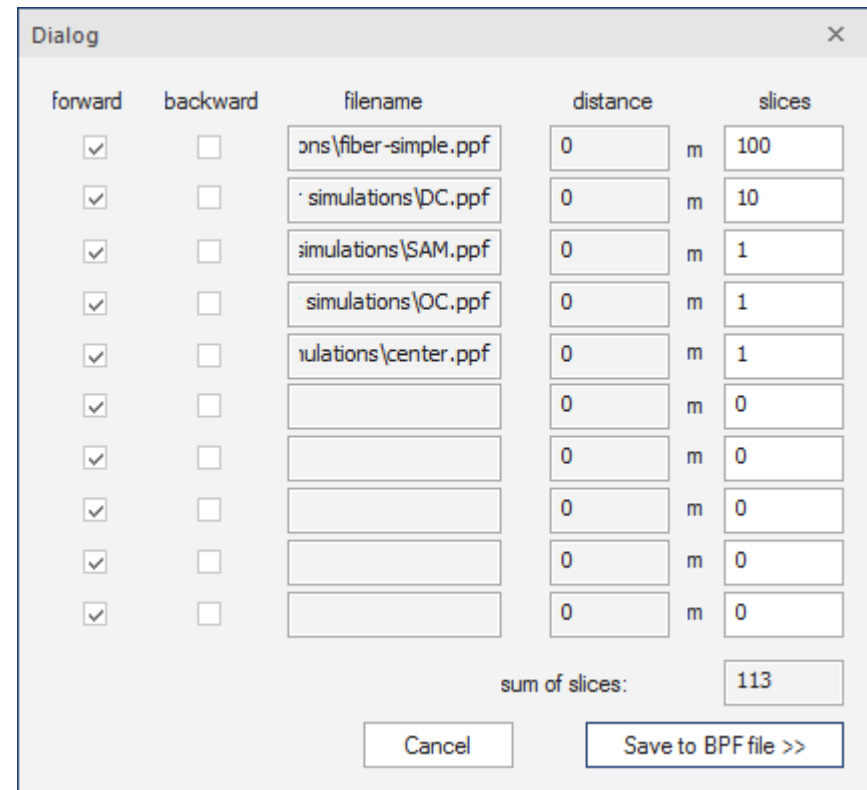
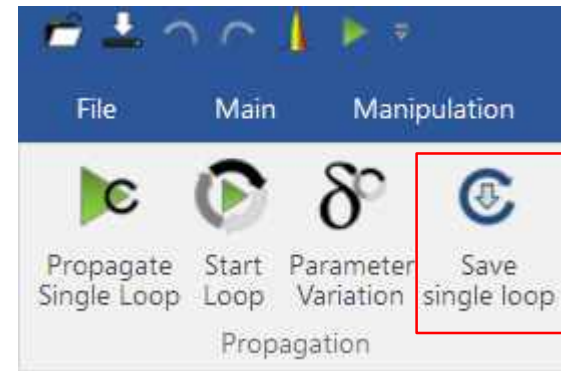
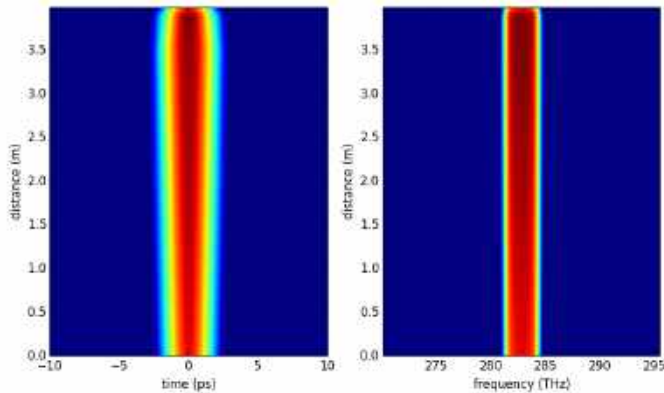


lecture 5

Multi-Element Propagation: Example: Short Pulse Fiber Lasers

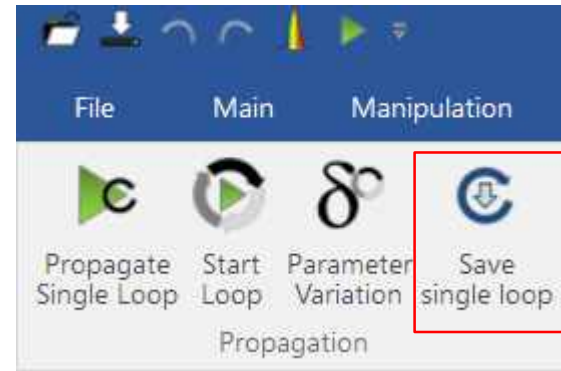
Intracavity evolution

- (1) select stable solution from saved file
- (2) specify slices to be saved
- (3) post-process

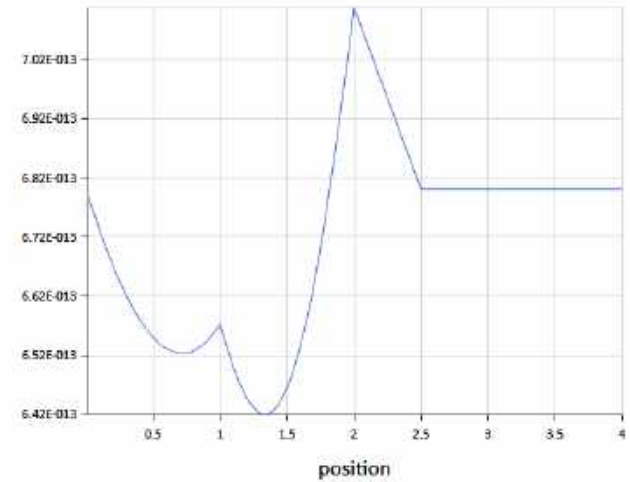
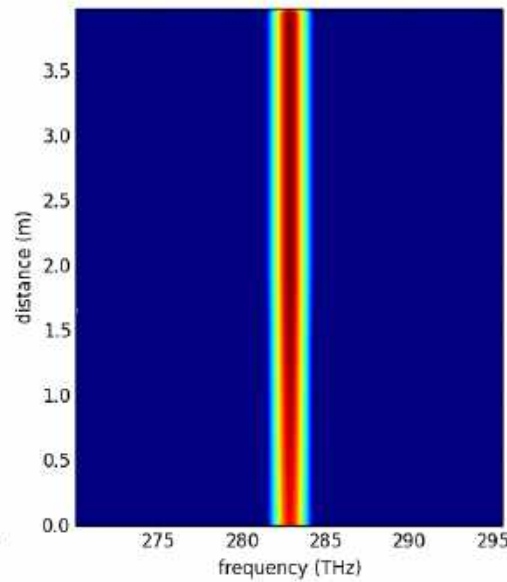
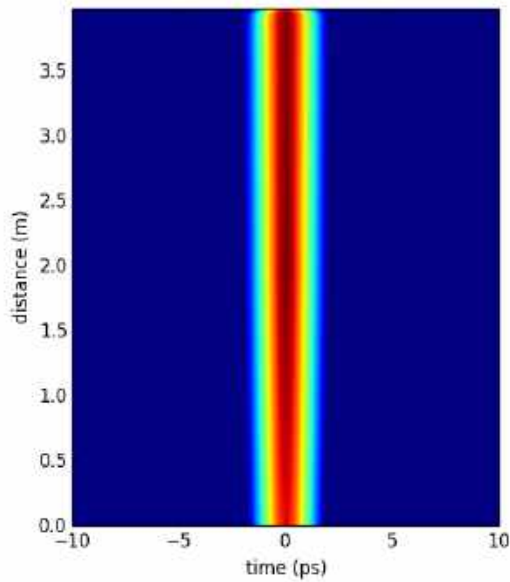


lecture 5

Multi-Element Propagation:
Example: Short Pulse Fiber Lasers



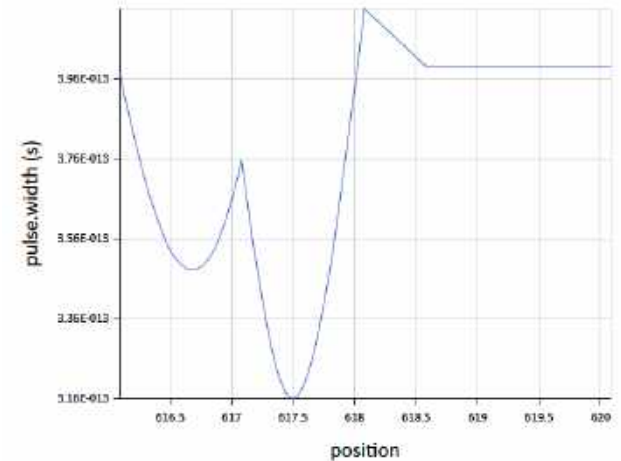
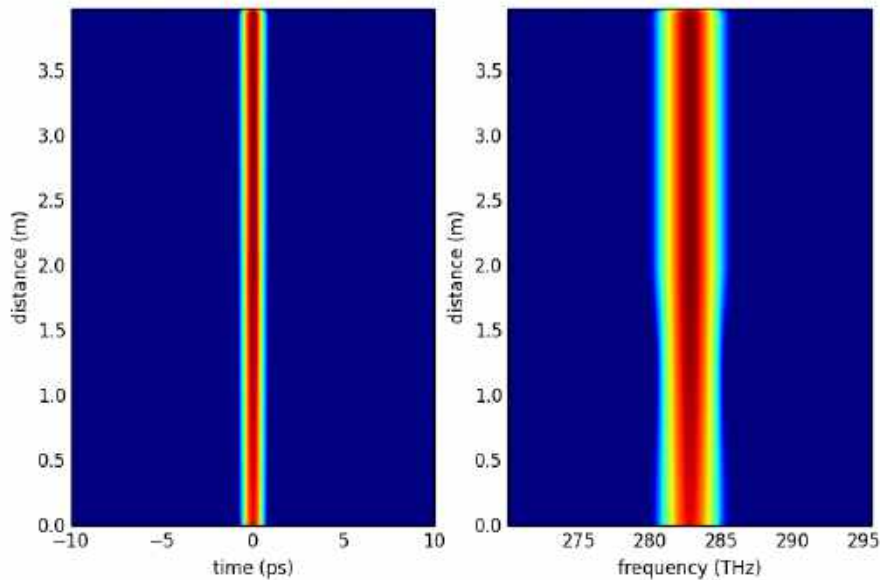
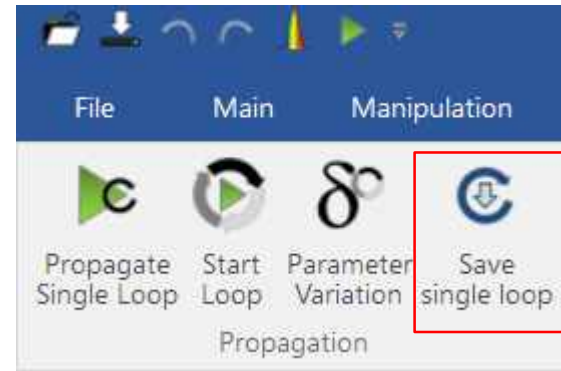
soliton solution: $\beta_2@DC = -0.06 \text{ ps}^2$



lecture 5

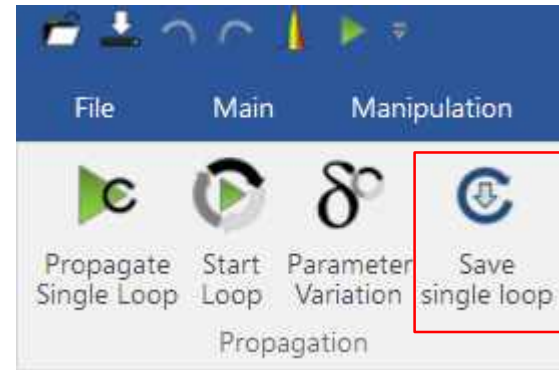
Multi-Element Propagation: Example: Short Pulse Fiber Lasers

soliton solution: $\beta_2@DC = -0.04$
 ps^2

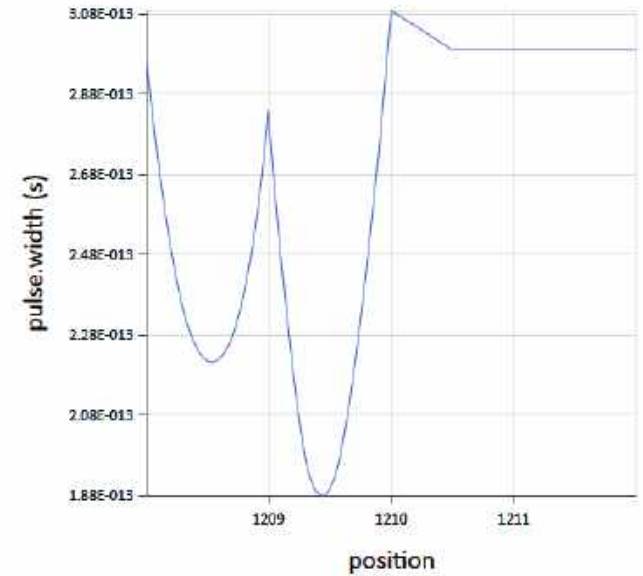
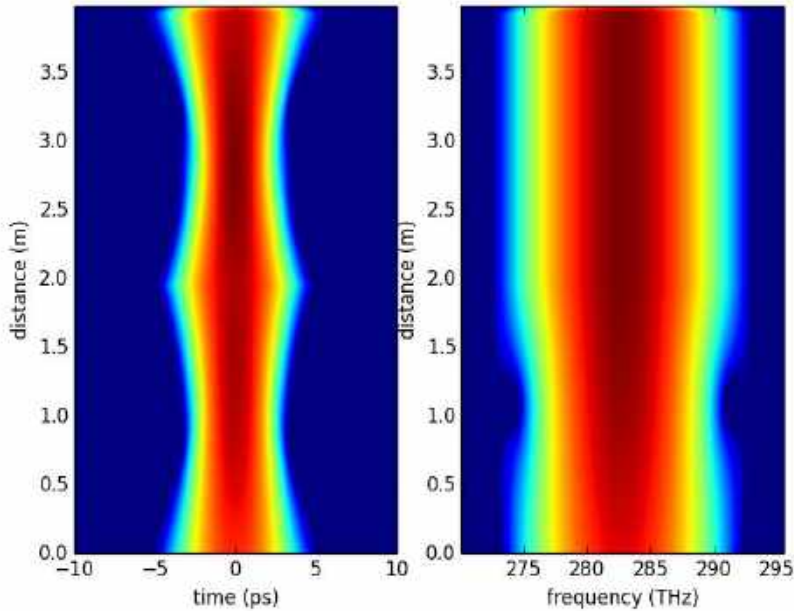


lecture 5

Multi-Element Propagation:
Example: Short Pulse Fiber Lasers



toward stretched pulse: $\beta_2@DC = -0.03 \text{ ps}^2$

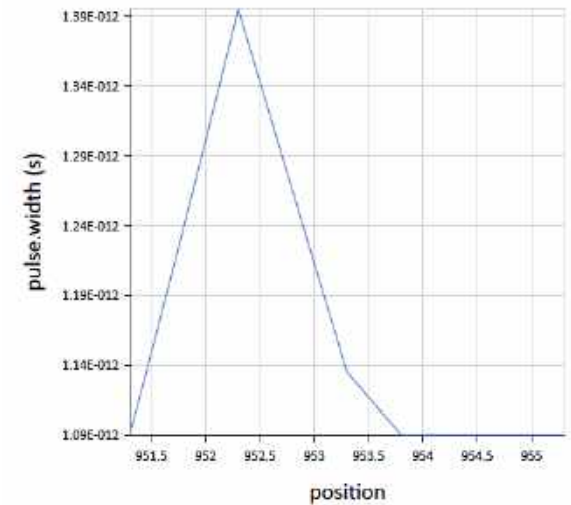
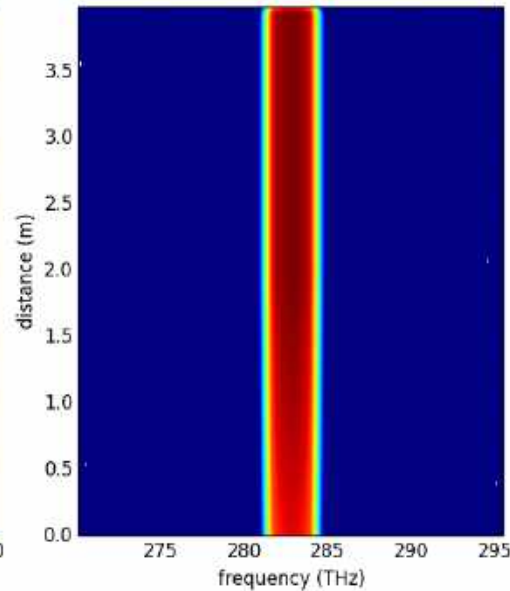
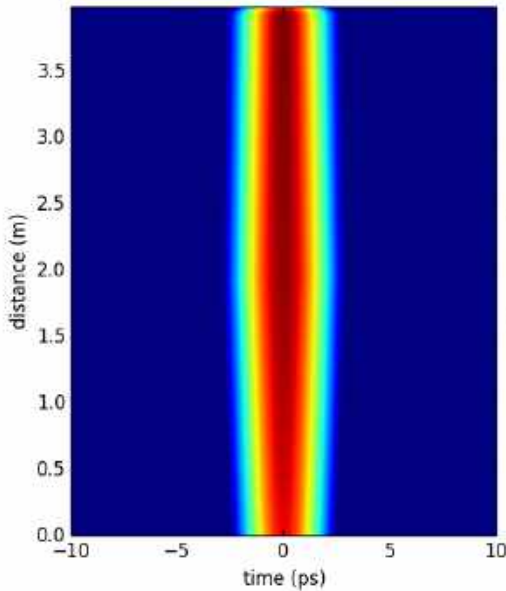


lecture 5

Multi-Element Propagation:
Example: Short Pulse Fiber Lasers

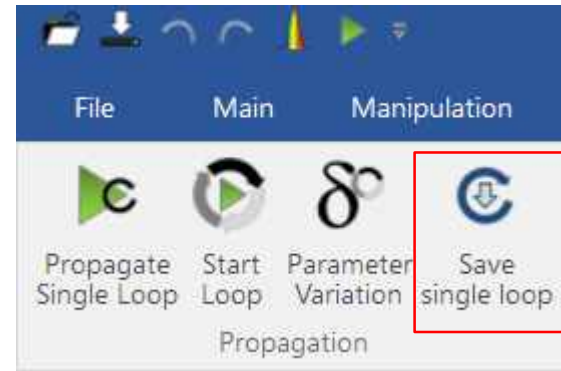


similariton: $\beta_{2@DC} = -0.02 \text{ ps}^2$

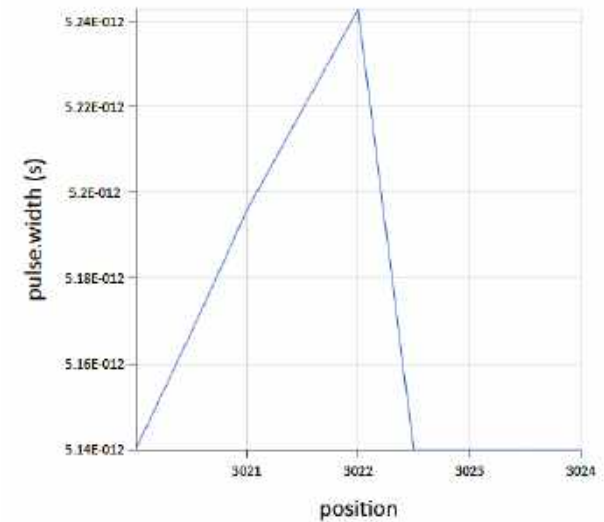
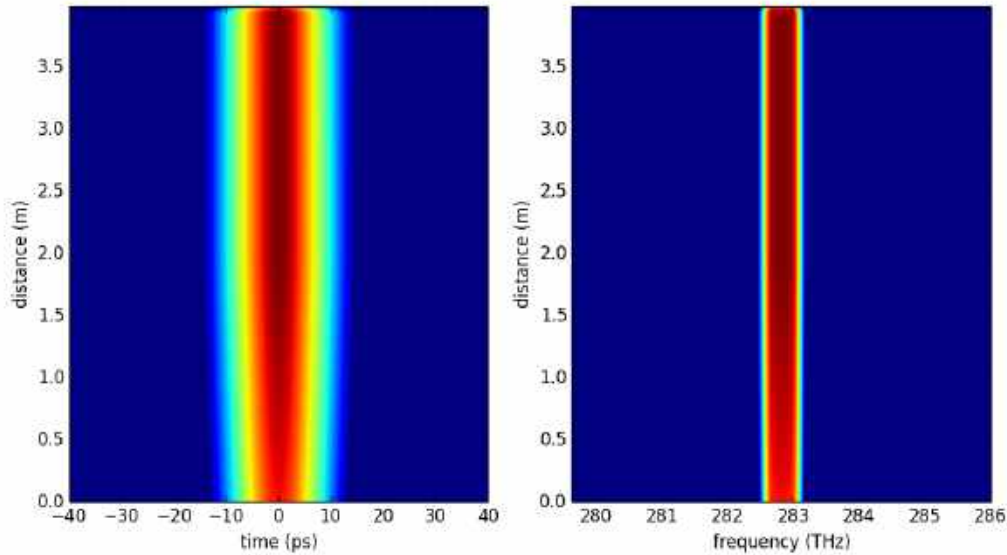


lecture 5

Multi-Element Propagation: Example: Short Pulse Fiber Lasers



chirped pulse oscillator: $\beta_{2@DC} = +0.02 \text{ ps}^2$



lecture 6

Rate-equation gain

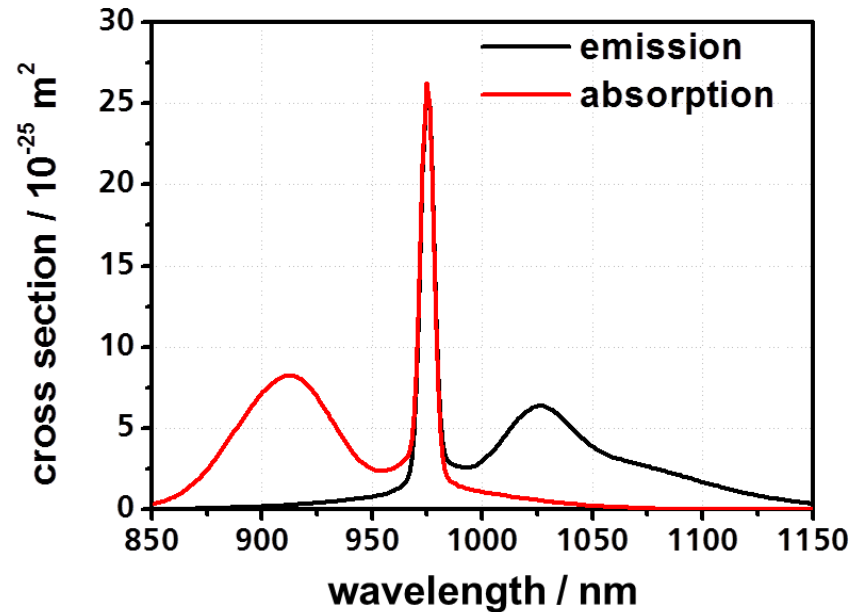
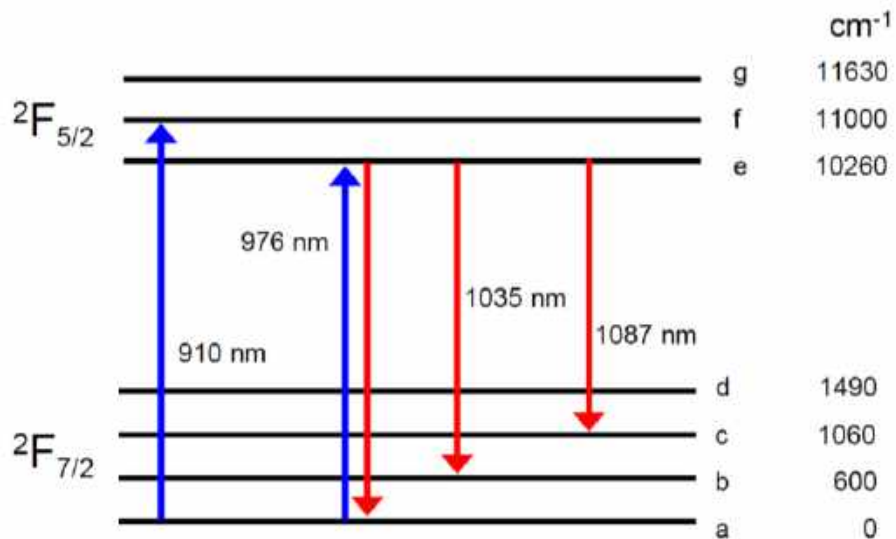
- (1) Simple cw oscillators
- (2) Nonlinear fiber amplifiers (in preparation)



lecture 6

Rate-equation gain

Solution of stationary rate-equation (effectively two level system) to describe pump- and signal powers as well as inversion in lasers and amplifiers.



lecture 6

Rate-equation gain

Solution of stationary rate-equation (effectively two level system) to describe pump- and signal powers as well as inversion in lasers and amplifiers.

$$\frac{dP_{P/S}^{\pm}}{dz} = \pm \left(\sigma_{P/S}^{em} n_2 \mp \sigma_{P/S}^{abs} n_1 + \alpha_{P/S} \right) \cdot \Gamma_{P/S} \cdot P_{P/S}^{\pm} \mp \overbrace{\sigma_{P/S}^{em} n_2 \cdot 2 \cdot h\nu_{P/S} \cdot \Delta\nu}^{ASE}$$

$$n_2 = \frac{\sum_{i=P,S} \frac{\sigma_i^{abs} \cdot n_0}{h\nu_i} \Gamma_i P_i}{\sum_{i=P,S} \frac{(\sigma_i^{abs} + \sigma_i^{em}) \cdot n_0}{h\nu_i} \Gamma_i P_i + \frac{1}{\tau}}$$

$n_0 = n_1 + n_2$ is the sum of upper and lower population density

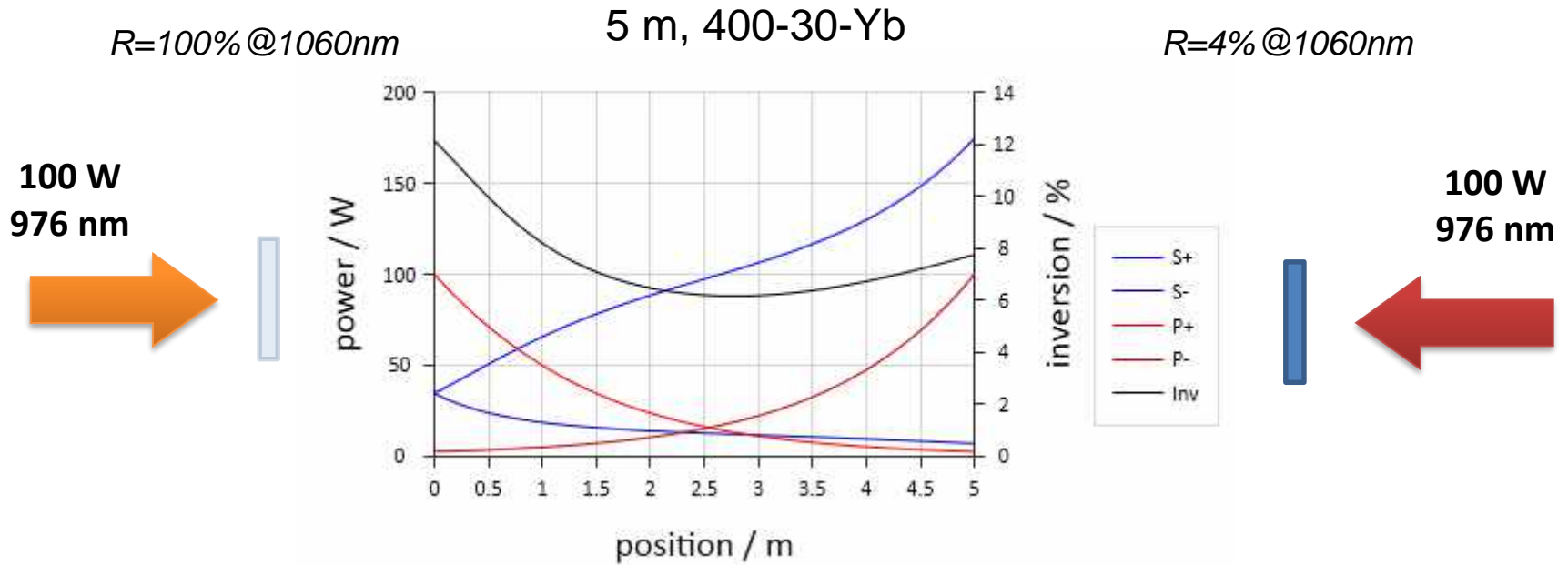
$\alpha_{P/S}$ is an additional loss (background loss)

τ as the upper state lifetime

assumed that the pump absorption can be described by a simple overlap factor Γ_p , which is the ratio of doped core area to pump core area.

lecture 6

Simple cw fiber laser – pumped from both sides



lecture 6

Simple cw fiber laser – pumped from both sides

empty field and numerics first

Rate Equation Setup

numerics pump signal RE-doping mirrors

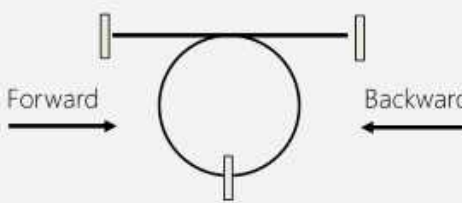
fiber length m
longitudinal steps along fiber

use NLSE forward (instead of powers only)

max. iterations
convergency
deceleration

use NLSE backward (instead of powers only)

include ASE



OK

Pulse Profile and Data Array

Half Interval ps +/- ps
FWHM ps +/- ps
TempShift ps +/- ps
phase rad +/- rad
Size Type

wavelength nm +/- nm
2nd order spectral phase fs² +/- fs²
3rd order fs³ +/- fs³

energy J +/- J
average power W +/- W
repetition rate Hz

scramble spectral phase
 add quantum noise (one photon per spectral node)

double pulsing
separation ps relative magnitude

create field in data array 1 create field in data array 2
 add field to data array 1 add field to data array 2

OK Apply Cancel reset

lecture 6

Simple cw fiber laser – pumped from both sides

Rate Equation Setup

numerics **pump** signal RE-doping mirrors

forward pump

pump core diameter 400.0 μm

background loss 0 1/m

power (W)	wavelength (nm)	small signal absorption (dB/m)
100	976.0	0.9467770
0.0	976.0	0.9467770
0.0	976.0	0.9467770
0.0	976.0	0.9467770
0.0	976.0	0.9467770

Pump Forward

Pump Backward

backward pump

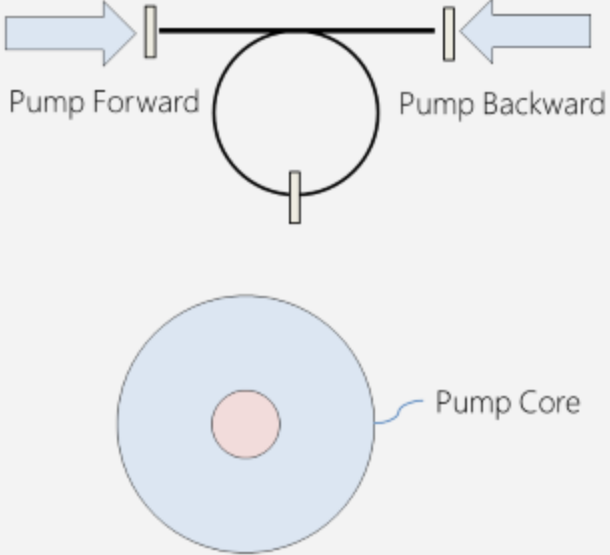
pump core diameter 400.0 μm

background loss 0 1/m

power (W)	wavelength (nm)	small signal absorption (dB/m)
100	976.0	0.9467770
0.0	976.0	0.9467770
0.0	976.0	0.9467770
0.0	976.0	0.9467770
0.0	976.0	0.9467770
0.0	976.0	0.9467770

Pump Core

OK



The diagram illustrates a fiber laser configuration. At the top, a horizontal line represents the fiber, with two blue arrows pointing towards each other from the left and right, labeled 'Pump Forward' and 'Pump Backward'. A small vertical bar is positioned at the center of the fiber. Below the fiber, a circular cross-section of the fiber is shown, consisting of a central pink circle labeled 'Pump Core' surrounded by a larger light blue circle representing the cladding.

lecture 6

Simple cw fiber laser – pumped from both sides

Rate Equation Setup

numerics pump signal RE-doping mirrors

signal background loss: 1/m

input

- use data array

output

- save output M2 to data array
- save output M1 to data array

Input Field

Output Field

Signal Core

OK

lecture 6

Simple cw fiber laser – pumped from both sides

Rate Equation Setup

numerics pump signal RE-doping mirrors

mirror M1

center	1060.0	nm
width	1.0	nm
reflectivity	100	%
reflectivity outside	0.0	%

mirror M2

center	1060.0	nm
width	1.0	nm
reflectivity	4	%
reflectivity outside	0.0	%

Intermediate Mirror (MI)

intermediate mirror

center	1060.0	nm	reflectivity	1060.0	%
width	1.0	nm	reflectivity outside	0.0	%
at position		0.0	m		

OK

lecture 7

Pulse manipulation

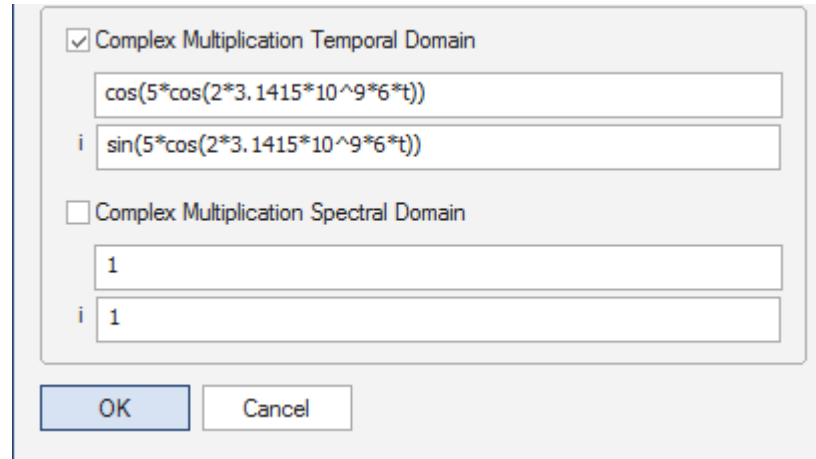
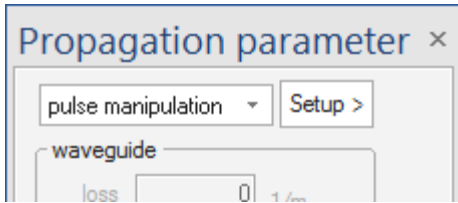
(1) Phase modulation



lecture 7

Pulse manipulation

(1) Phase modulation



lecture 8

Nonlinear Optical Loop Mirror



lecture 8

Nonlinear Optical Loop Mirror

The loop shall be a single nonlinear element without dispersion.

Save this element as
testNOLM.ppf

The screenshot shows the FiberDesk software interface. The main window is titled "Propagation paramet..." and contains several sections:

- standard propagation**: A dropdown menu set to "standard propagation" with a "Setup >" button.
- waveguide**: Fields for "loss" (0 1/m), "gain" (0 dB/m), "MFD" (20 μm), "gamma" (0.000412903225806456 1/(W.m)), and "Esat" (94247 μJ).
- simulation**: Checkboxes for "dispersion", "Raman", "spm" (checked), and "self-steepening". A "parameter" field is also present.
- temporal gain saturation**: A checkbox that is checked.
- steps**: "steps" (100), "stepsize" (0.01 m), and "distance" (1 m).
- measure and parse**: A checkbox that is unchecked.
- write file**: A checkbox that is unchecked, with a "100" field next to it.
- adaptive local error**: A field set to "0.0001" and a "presets" dropdown menu.
- random temporal clipping**: A checkbox that is unchecked.

On the right, there is a "Watch" window titled "fibers1" showing "user defined measurements >>". It contains a table with the following data:

data	value
pulse1	
M0 - index	0
M1 - position	0.000 m
M2 - distance	0.000 m
M3 - datapoints	1024
M4 - pulse energy	1.600 pJ

Below the watch window, there is a red-bordered box titled "self phase modulation term" containing the following mathematical expressions:

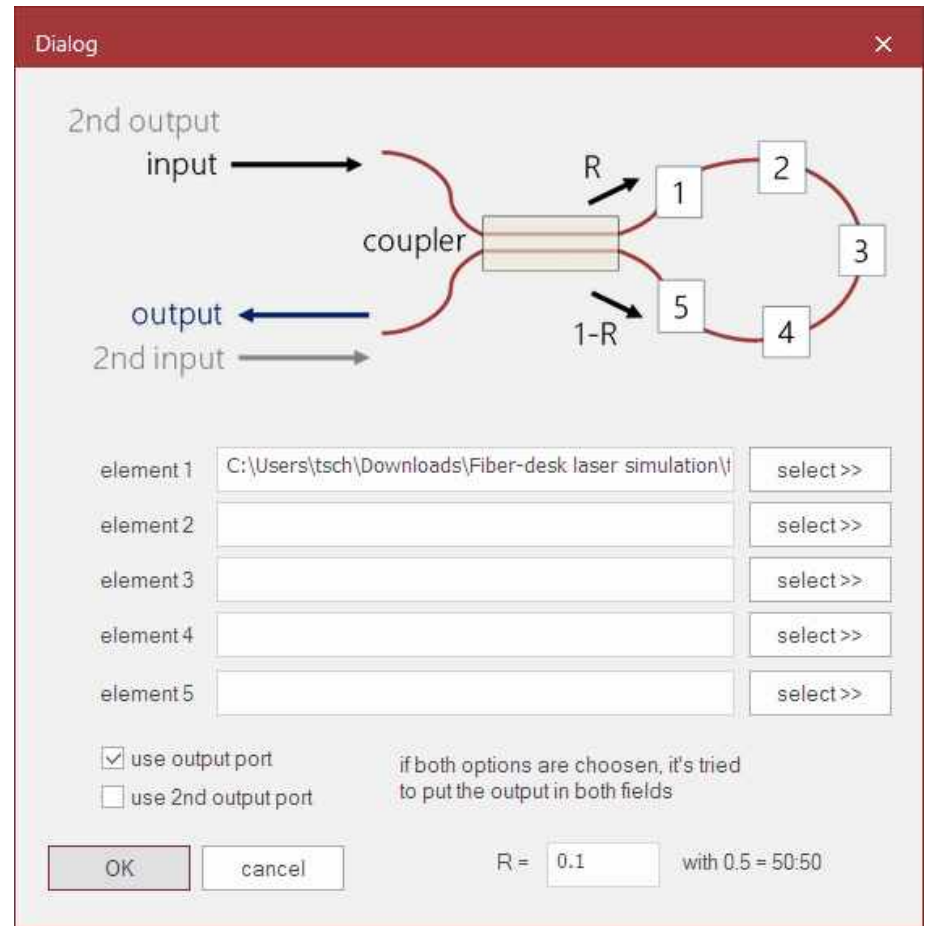
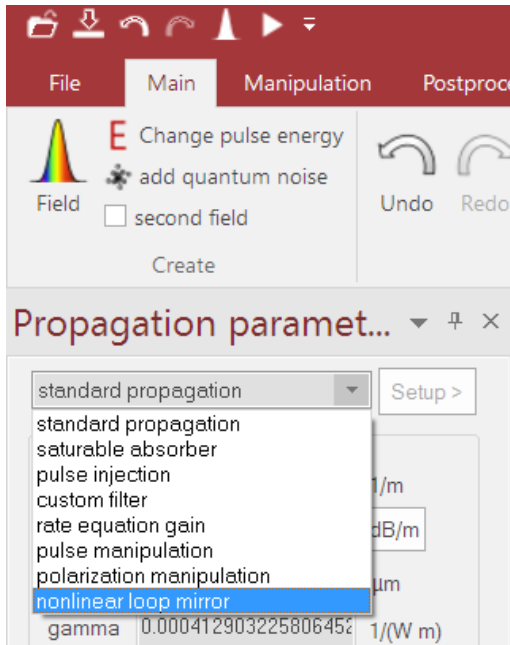
$$\frac{\partial A}{\partial z} = \dots + i\gamma(1 - f_R)A(T)$$
$$\gamma = \frac{\omega_0}{c} \frac{n_2}{A_{\text{eff}}} \quad \text{and} \quad A_{\text{eff}} = \frac{\pi}{4} MFD^2$$

Below the equations, there are input fields for "n2" (3.2e-20 m²/W) and "fR" (0.18). There are also checkboxes for "saturate SPM" (unchecked) and "use SPM" (checked). A "saturation power" field is set to "1.0 GW/cm²". There is also an "exclude SPM" checkbox that is checked.

lecture 8

Nonlinear Optical Loop Mirror

Choose the NOLM element and start the setup dialog



Select the previously saved file for the first element. The output will be the result.

lecture 8

Nonlinear Optical Loop Mirror

In order to see the effect of the nonlinearity in the loop, please define a new pulse as „cw“ according to the settings here.

Pulse Profile and Data Array

Half Intervall: 8 ps +/-

FWHM: 10000000 ps +/-

TempShi: 0 ps +/-

phase: 0 rad +/-

Size: 1k (2^10) Type: Gauss

wavelength: 1060 nm +/-

2nd order spectral: 0 fs² +/-

3rd order spectral: 0 fs³ +/-

energy: 1.6e-12 J +/-

average: 0.1 W +/-

repetition rate: 6.25e+10 Hz cw

scramble spectral pha...

add quantum noise (one photon per spectral no...

double pulsing

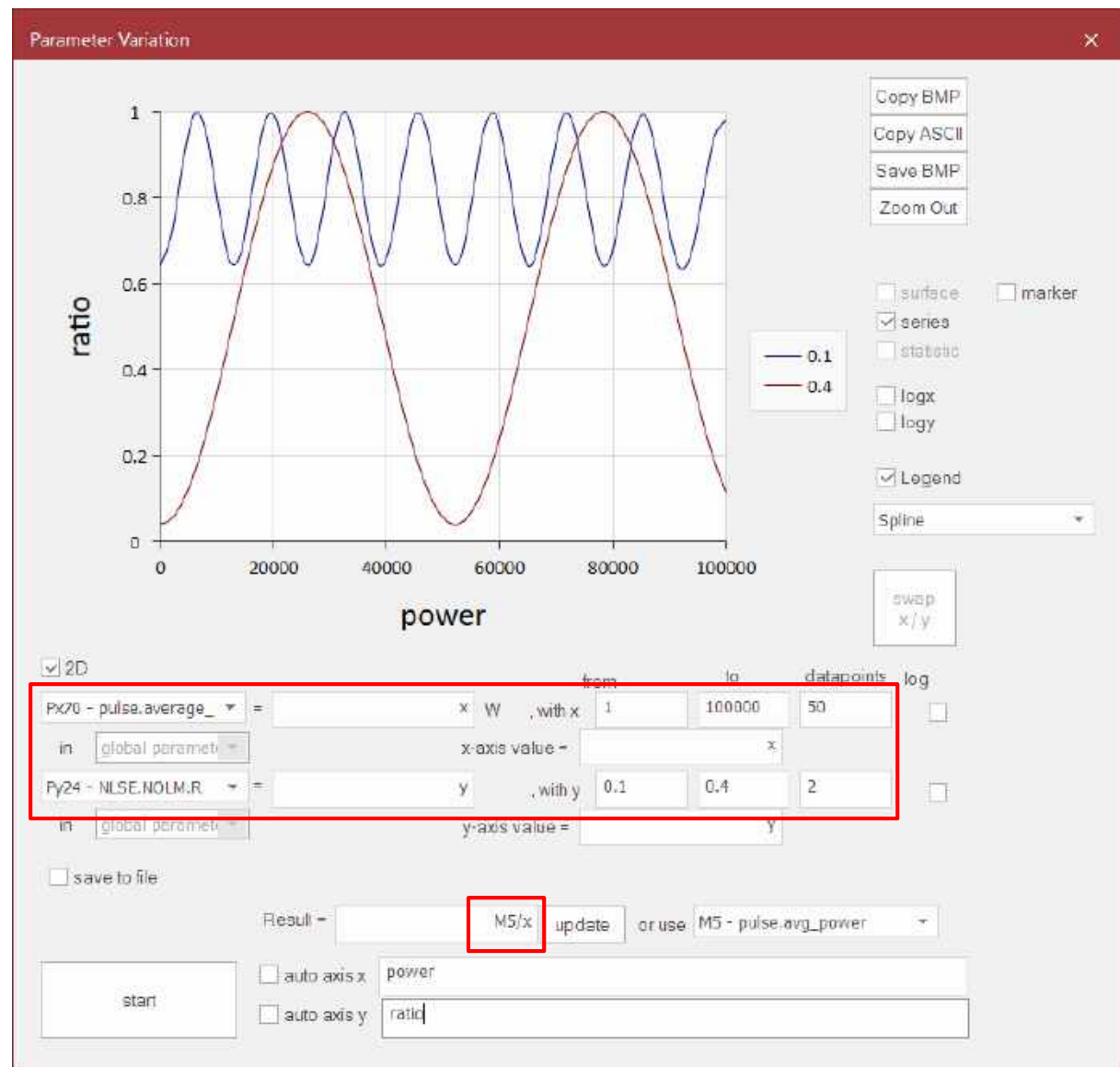
separator: 0 ps relative magnitude: 0

create field in data array 1 create field in data array 2

add field to data array 1 add field to data array 2

OK Apply Cancel reset

lecture 8



Now the power is varied in the parameter variation dialog as well as the splitting ratio. The displayed results is the output power over the input power.